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THE

EDINBURGH MEDICAL AND SURGICAL JOURNAL:

EXHIBITING

A CONCISE VIEW

OF THE

LATEST AND MOST IMPORTANT DISCOVERIES

IN

MEDICINE, SURGERY, AND PHARMACY.

VOLUME FORTY-FIFTH.

1836.

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No. CXXVII.

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Page 439, *line* 19 *from top*, *for* course *read* cause.

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NOTICES TO CORRESPONDENTS.

Communications have been received from Dr HARRISON, Dr WOODFORDE, Dr AITKEN, and Mr ROSE.

In reply to Dr Woodforde, we beg to inform him, that the paper mentioned has not reached its destination.

The following works have been received:—

A Further Inquiry concerning Constitutional Irritation and the Pathology of the Nervous System. By Benjamin Travers, F. R. S. Senior Surgeon to St Thomas's Hospital, &c. &c. London, 1835. 8vo. Pp. 444. This work was omitted to be acknowledged at the proper time.

A Treatise on the Diseases of the Eye and its Appendages. By Richard Middlemore, M. R. C. S. Surgeon to the Birmingham Eye Infirmary. In two volumes. London, 1835. 8vo. Pp. 800 and 844.

Illustrations of the Comparative Anatomy of the Nervous System. By Joseph Swan. Part I. London, 1835. 4to. Pp. 27. Seven Engravings.

Guy's Hospital Reports, No. I. January 1836. Edited by George H. Barlow, M. A. Trin. Coll., Cantab. Inceptor Candidate of the R. Coll. of Physicians, and James P. Babington, M. A., Trin. Coll. Cantab., Memb. R. Col. Surgeons. London, 1836. 8vo. Pp. 188.

A Practical Treatise on Urethritis and Syphilis, including Observations on the power of the Menstruous Fluid, and of the discharge from Leucorrhœa and sores, to produce Urethritis; with a variety of Examples, Experiments, Remedies, and Cures; a New Nosological Classification of the various Venereal Eruptions, each order illustrated by Coloured Plates, and exemplified by numerous Cases; and a proposal of a substitute for Mercury. By William Henry Judd, M. R. C. Surgeons. London, 1836. 8vo. Pp. 568.

Remarks on the Unity of the Body, as illustrated by some of the more striking phenomena of Sympathy, both Mental and Corporeal, with the view of enlarging the grounds and improving the application of the Constitutional Treatment of Local Diseases. By George Macilwain, M. R. C. Surgeons. London, 1836. 8vo. Pp. 294.

A Brief Memoir of Sir William Blizard Knt., F. R. S., L. and E., Surgeon and Vice President of the London Hospital. Read before the Hunterian Society, October 7, 1835, with additional particulars of his Life and Writings. By William Cooke, Member R. C. Surgeons. London, 1836. Pp. 67. 8vo.

On Insanity; its Nature, Causes, and Cure. By William B. Neville, Esq. of Earl's Court House. London, 1836. 8vo. Pp. 192.

A Treatise on the Prevention and Cure of Pulmonary Consumption. By Robert Little, M. D., &c. London, 1836. 8vo. Pp. 160.

A Treatise on the Chemical, Medicinal, and Physiological Properties of Creosote. Illustrated by Experiments on the Lower Animals; with some Considerations on the Embalment of the Egyptians, being the Harveian Prize Dissertation for 1836. By John Rose Cormack, M. of the R. Med. and Phys. Societies of Edinburgh. Edin. 1836. 8vo. Pp. 154.

Memoir of James Jackson Junior, M. D. with extracts from his Letters to his Father; and Medical Cases collected by him. By James Jackson, M. D. Professor of Theory and Practice of Physic in Harvard University, &c. Boston, 1835. 8vo. Pp. 444.

Rudiments of Physiology by Dr Fletcher. Part II. Edinburgh, 1836. Pp. 276.

On the Analysis of the Blood and Urine in Health and Disease; with Directions for the Analysis of Urinary Calculi. By G. O. Rees. London, 1836. 8vo. Pp. 147.

An Essay on the Laryngismus Stridulus, or Croup-like Inspiration of Infants; to which are appended, Illustrations of the General Principles of the Pathology of Nerves, and on the Functions and Diseases of the *Par Vagum,* and its Principal Branches. By Hugh Ley, M. D., M. R. C. Ph. London, &c. Illustrated with Plates. London, 1836. 8vo. Pp. 480.

A Letter to the Reform Corporations on the Necessity of Electing Medical Coroners. By George Rogerson, Surgeon of Liverpool. London, 1836. 8vo. Pp. 18.

A Report on the Medical Management of the Native Jails throughout the Territories subject to the Governments of Fort William and Agra; to which are added, some Observations on the Principal Diseases to which Native Prisoners are liable. By James Hutchinson, A. M., M. R. C. Surg. London, &c. Calcutta, 1835. 8vo. Pp. 107.

A Manual of Medical Jurisprudence and State Medicine, Compiled from the latest Legal and Medical Works of Beck, Paris, Christison, Foderé, Orfila, &c. By Michael Ryan, M. D., M. R. C., Physicians in London, &c. London, 1836. 8vo. Pp. 554, 1836.

The Cyclopedia of Anatomy and Physiology. Edited by Robert B. Todd, M. B., &c. Part V. Illustrated with numerous Engravings, in Three Parts.

This work, of which we have received five numbers, promises to be highly useful to the medical reader. Though all the articles are not of equal merit, they in general afford correct views of the present state of anatomical and physiological knowledge. We expect soon to give more detailed accounts of the work.

A Lecture on the Elements of Physical Education. By M. Louis Frechet. Read at the Philosophical and Literary Institutions at Bristol and Bath, the 7th October 1835. Bristol, 1836. 8vo. Pp. 36.

An Address delivered at the First Anniversary Meeting of the Birmingham School of Medicine and Surgery. By James Thomas Law, Chancellor of the Diocese of Lichfield. Birmingham, 1835. 8vo. Pp. 21.

The Medico-Chirurgical Review and Journal of Practical Medicine. Edited by James Johnson, M. D., &c. New series. No. 47. January, 1836.

N. B.—The 44th Number not come to hand.

The British and Foreign Medical Review, or Quarterly Journal of Practical Medicine and Surgery. Edited by John Forbes, M. D., F. R. S., and John Conolly, M. D., &c. No. I. January 1836. London.

The London Medical Gazette for Session 1835-36, from No. 12, December 19, 1835, to No. 24, 12th March 1836.

THE

EDINBURGH

MEDICAL AND SURGICAL JOURNAL.

1. JANUARY 1836.

PART I.

ORIGINAL COMMUNICATIONS.

ART. I.—*Clinical Report for the Summer Session* 1835. By JAMES SYME, Esq. Professor of Clinical Surgery in the University of Edinburgh, and Surgeon to the Royal Infirmary.

Acute Inflammation of the Tibia—Death of the Shaft—Amputation—Progress of Reproduction.—NOTWITHSTANDING all that has been said and done to elucidate the subject of necrosis, there are still several circumstances in its history which remain very mysterious. One of the most interesting of these is the process by which exfoliations comprehending the whole thickness of a bone are reproduced. That the whole thickness of a bone may be regenerated, we have daily evidence afforded by the separation of large portions, and sometimes nearly the entire shafts of the tibia and humerus, without any permanent deficiency either as to size or strength in the bone affected. But we have seldom an opportunity of investigating by dissection the reproductive process at a stage sufficiently early for discovering the nature of the steps by which it accomplishes ossification. When patients die of necrosis, or are subjected to amputation to relieve them from the long-continued drain of the disease, the new bone is too matured for showing any trace of its origin. And in those more uncommon cases of acute disease, in which the limb requires to be removed almost immediately after the death of the bone, sufficient time is not afforded for the developement of the new formation. In a former Report (August 1829, No. 101,) I related the case of a boy whose thigh was amputated on account of necrosis of the tibia supervening suddenly upon inflammation, and attended with suppuration of the knee-joint; but as only ten days had elapsed since the commencement of the disease, the limb removed did not yield any information with regard to the production of a new bone. And all the other cases of the same kind that have hitherto fallen within my observation were equally barren of instruction. In the case which is now to be detailed, the process of reproduction had advanced just to the extent desirable for pathological inquiry, and I think it will go far to put at rest the long agitated questions on this subject.

Beatrice Stokes, aged 13, strained her ankle by a false step on the 24th of March. She suffered little inconvenience until the following day, when the pain became so severe as to render her unable to walk. Rigors, vomiting, and headach, attended with intense pain in the leg, and the usual symptoms of inflammatory fever soon followed.

She was sent to the hospital from Tranent by Dr S. Alison on the 21st of April. The fever still continued undiminished, with occasional delirium, and the limb presented the appearance of phlegmonous erysipelas from the middle of the thigh down to the toes. It was red, swelled, and tense, except at the fore part of the leg, a little above the ankle, where fluctuation could be felt. Incisions were made with the effect of evacuating a large quantity of thick dark-coloured matter, and greatly relieving the patient.

Through the openings that had been made for this purpose, the bone was found extensively denuded, and as the discharge continued very profuse, with frequent rigors, delirium, and rapidly declining strength, it became necessary to amputate the limb. This was done on the 29th, above the knee, and though the recovery was tedious, in the first instance from exhaustion, and afterwards from exfoliation of the bone, it terminated in recovery.

When the limb was examined, it appeared that nearly the whole articulating cartilage of the ankle-joint had been removed by ulceration, leaving the bone bare and rough. The shaft of the tibia seemed to be dead throughout almost its whole extent, and had already undergone considerable erosion by the absorbents at its junction with the cancellated texture adjoining the epiphyses. When the finger was carried along the surface of the dead bone through an incision that had been made to expose it, a dense case or shell was felt, which, when displayed by dissection, proved to be the periosteum greatly thickened, with osseous matter deposited in its substance. The membrane was traced distinctly from its sound part where covering the epiphyses, over the dead shaft, and no one who saw it could doubt that it afforded the bed or matrix in which the new bone was deposited. Where covering the posterior surface of the tibia, though detached from the bone, it had suffered comparatively little change, which rendered its recognition at other parts more certain. The new bone did not constitute a continuous shell, but was deposited in flat masses or scales of various extent, between which the periosteum intervened so as to insulate them completely from each other, or any portion of the old bone retaining its vitality. The osseous substance lay on the inner surface of the periosteum, with merely a fine film of the membrane covering it, but with a considerable quantity of soft gelatinous substance like coagulable lymph effused over this, so as to line the interior of the case. At several parts of irregular size and figure, the periosteum did not exist, and at these parts there was a corresponding deficiency in the new bone. These apertures resembled the *cloacæ*, as they are named, which exist in the investing shells that are formed in cases of necrosis, and are usually ascribed to absorption induced by the pressure of matter confined within the bone. But it seems more probable from this case, that the deficiencies in question depend upon the periosteum being destroyed at particular points in the commencement of the disease.

In explaining the history of this case, I think it may be reasonably supposed that the strain of the ankle occasioned inflammation of the joint, which extended to the tibia, and led to ulceration of the articular cartilages, and death of the shaft of the bone; that then suppuration took place under the periosteum, which having become at some parts disorganized, allowed the matter to pass outwards and distend the skin; that lymph was effused from the inner surface of the remaining periosteum, and also into its substance, so as to render it much thicker and softer than usual; and that then bone was deposited towards the inner surface of the membrane in numerous detached points, from which it was proceeding so as to make them coalesce, and constitute a cylindrical case to the shaft.

The engraving, Figure 1, Plate I. represents the appearance of the bone after being dissected and dried. The largest deficiencies in the shell were at A and B. The one at A has been enlarged by an incision which was made after the operation to display the extent of dead bone, and before the existence of a substitute was discovered, but the one at B has not been altered.

Necrosis of the Tibia—Separation of nearly the whole Shaft—Recovery.—Catherine Moir, aged 10, from Orkney, recommended by Dr Traill, was admitted on the 23d of April. Her right leg presented the appearance of necrosis in an advanced stage, being altered in shape, and allowing the surface of the tibia to be seen and felt, through various openings between the knee and ankle. At the upper and fore part of the limb the exfoliation was visible for the extent of between two and three inches, and the substitute shell had been here so imperfectly formed, that the leg was quite flexible. The flexors of the knee-joint had in consequence of this yielding caused a remarkable contraction by bending back the upper end of the tibia, so as to make it form an angle with the lower portion. She stated that the complaint had commenced about four months before with swelling, redness, and pain of the leg, which was poulticed for a week, when a large quantity of matter was discharged, and the bone was felt bare. Several openings were made afterwards, but no exfoliations had separated.

On the 2d of May I removed the large piece of dead bone that presented itself to view, having previously divided a bridge of the shell which crossed it, and then found that a still larger portion which had constituted the opposite side of the cylinder still remained. This having been also extracted, together with a smaller part that lay nearer the ankle, the limb was laid upon an inclined plane and supported with splints. The discharge was very profuse for some time afterwards, and the sore was slow in taking on a healing action, but at length contracted and healed, with the exception of a small sinus which led towards the head of the bone. The limb had become much straighter, and gradually acquired considerable firmness. She was dismissed on the 5th of June.

Necrosis of the Lower Jaw—Separation of the ramus with the entire condyle—Recovery without alteration of shape or diminution of mobility.—William M'Haffie, aged 31, two years ago, suffered an ineffectual attempt to extract a grinding tooth of the lower jaw, the crown of which was broken off, and the root left. For some days afterwards intense pain was felt throughout the side of the face affected, and the jaw became locked. Some leeches were then applied, and he felt completely relieved. Seven months after this he was suddenly seized with intense pain, rigors and fever, and a large swelling of the neck formed, which when opened discharged a great quantity of matter. By persevering efforts the jaw, which had again become locked, was gradually opened sufficiently to permit extraction of the stump, after which he felt so much relieved as to be able to resume his employment.

There still, however, remained a large hard swelling of the cheek, extending from the zygomatic arch to the base of the jaw, and some small pieces of bone came away from time to time through the opening in the gum that had been left by the tooth. The patient applied to me on the 23d of April in a state of great weakness and alarm, in consequence of a profuse bleeding which had taken place on that and the preceding day. He stated that some weeks previously very violent efforts had been used without success to extract a portion of the jaw which projected into the mouth. The hemorrhage proceeded fróm the cavity containing this exfoliation, and not only flowed into the mouth, but also issued on the cheek, through a small sinus which opened a little below the articulation.

Both orifices were stuffed with lint, and the patient was sent to the hospital to be under observation. Next day, as it appeared that the bleeding had continued pretty copiously during the night, the removal of the exfoliation could not with propriety be any longer delayed. I therefore made a free enlargement of the opening into the mouth, and extracted without any difficulty the piece of bone marked A. Figure 2, Plate I. There was no return of the bleeding, the swelling diminished, and the patient in a few days resumed his employment. Some weeks afterwards, he returned on account of another exfoliation which he felt protruding through the opening into the mouth. This was readily removed, and is represented in the same figure, marked B. It was plainly the condyle and neck of the jaw, and fitted so accurately to the portion formerly extracted, that it must evidently have been separated from it by violence, and not by absorption. It is probable that when this happened, the sharp edges of the broken fragments had injured the internal maxillary artery where crossing the neck of the condyle, and led to its subsequent ulceration. The remaining enlargement of the cheek quickly subsided, and the motion of the jaw became quite free.

It seems at first sight difficult to explain how recovery is effected in such a case as this, since the condyloid process, with its investing cartilage and synovial membrane, of course cannot be regenerated. When the articulating surface of the jaw dies, suppuration of the joint will be a necessary consequence, the whole articulating cartilage will be absorbed, and the surface corresponding to it, where the bone is still alive, covered with granulations. I should suppose that the surrounding periosteum will then become thickened, and have osseous matter deposited in it, so as to form a new bony shell, extending up to the neck of the condyloid process, and which, when the exfoliation is removed, will contract, to form a solid mass in its place. Between the surface of this new bone and that of the glenoid cavity, a fibrous union will next ensue, sufficient, by its bulk, to prevent deformity from the deficiency of bone that must in some degree still exist, and flexible enough to allow the mobility required. That such is really the process pursued, will appear still more probable from the following case.

Necrosis of the head of the Humerus—Removal of the Exfoliation—Recovery.—In 1769, Mr White, of Manchester, read before the Royal Society a " Case in which the upper head of the *os humeri* was sawn off, a large portion of the bone afterwards exfoliated, and yet the entire motion of the limb was preserved."—The patient was a boy of 14 years of age, who "had been suddenly seized about a fortnight before with a violent inflammation in his left shoulder, which threatened a mortification, but at last terminated in a large abscess, which was opened with a lancet a few days before his admission." Through this opening, and another that had formed spontaneously under the acromion process, the *os humeri* could be felt and seen " totally divested of its bursal ligament."

Mr White made an incision from the acromion process half way down the arm, protruded the head of the bone through the opening thus obtained, and sawed it off. At the end of two months he found that a large piece of the remaining bone had become loose, and easily removed it with a pair of forceps. The patient was perfectly cured at the end of four months from the operation. The arm was then not quite an inch shorter than the other, and he had the perfect use of it. In a work published some years ago,* I expressed my persuasion that this was not a case of caries, as it had generally been regarded, but one of acute necrosis; and the following very curious companion to it at a more advanced stage, seems strongly corroborative of that opinion.

Thomas Cairns, aged 13, from Saline, recommended by Mr Craig of Ratho, was admitted on the 30th of June, on account of a great enlargement of the right shoulder, attended with pain and discharge of matter. It was stated that ten months before he had fallen from a wall about four feet high among loose stones, and afterwards had been pretty severely handled by a bone-setter, who alleged that the humerus was broken near the joint. Inflammation and suppuration followed, openings for the discharge of matter took place at various parts, the joint became stiff, and the patient's strength declined. In these circumstances, he was sent to town to be under my care.

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* Treatise on the Excision of Diseased Joints, 1831.

As it was impossible to obtain any satisfactory information in regard to the condition of the joint by introducing a probe, I enlarged the sinus that led most directly towards it sufficiently to admit my finger, with the point of which the head of the bone was felt bare and smooth. The extreme firmness of the surrounding parts prevented a more free examination, but the information thus gained, together with the history of the case, convinced me that a portion of the bone was dead, and detached. I therefore extended upwards the incision already made, finding it necessary to use for this purpose both the knife and cutting-pliers, and then ascertained that the exfoliation lay loose in a bony case. Being unwilling to remove any of the new formed osseous substance which was destined to take the place of the old bone, I forcibly dilated the edges of the aperture until the shell gave way sufficiently to permit the extraction of the sequestrum, which was then easily effected. After the principal portion represented in Fig. 2, Plate III. was removed, some small pieces were found lying in the cavity, which proved to be fragments of the dense plate that had formed the convex surface of the head of the bone. The glenoid cavity of the scapula was divested of cartilage, but covered with a smooth firm velvet like lining of granulation. Recovery was delayed by unhealthy action of the sore, which assumed a phagedenic, and afterwards a sloughing character, but was so far completed on the 7th of September that the boy returned home with an arm not perceptibly shortened, and, though still stiff at the shoulder, nearly as useful as ever.

The only circumstance in Mr White's case which occasioned any doubts of its being an instance of necrosis, was the appearance of the portion of bone removed by him, Fig. 1, Plate III., as it did not present the convex shape of the head of the humerus, and certainly, from the diminution of its bulk as well as rough surface, had a carious look. But the case just related was unquestionably one of necrosis, and yet the exfoliation exhibited precisely the same appearance. This circumstance, therefore, can no longer be regarded as any objection to the opinion in question, and may perhaps be accounted for by the stronger vital power of the cancellated texture enabling it to resist the inflammation which proved fatal to the neighbouring bone, and leading to its destruction by absorption instead of mortification.

Caries of the Atlas and Vertebra Dentata— spontaneous dislocation of the Processus Dentatus—Death— Dissection.—I was asked on the 30th of March to see William Collins, aged 17, in a house near the Infirmary, and recognizing the peculiar characters of disease in the first joint of the neck, advised his removal to the hospital. On both sides of his neck there were traces of scrofulous abscesses, some of which had healed and others still remained open, but his principal complaint was deep-seated pain at the base of the skull, extending forwards to the throat, at all times severe and greatly aggravated by motion of the head, which was consequently kept very steady either in the erect or horizontal posture. It was this remarkable fixture of the head, which, when turned, moved along with the trunk as if no joints existed in the spine, together with his emaciation and peculiar expression of countenance, indicative of habitual suffering and apprehension, that led me at once to decide upon the nature of the case. He stated that his neck had been swelled and sore for twelve months, but that the complaint which has just been described had not lasted more than eight weeks, and it was ascertained that a short while before that time he had been struck on the neck with a thick piece of wood.

The actual cautery was applied to the nape of the neck on the 6th of April, and a very decided improvement soon afterwards appeared. The pain became much less severe, the countenance lost much of its peculiar expression, and when the patient sat up in bed he rotated his head with comparatively little uneasiness. The hopes thus raised were not destined to be of long duration. In two or three weeks he again began to complain, and though occasionally a little relieved never afterwards presented the slightest prospect of ultimate recovery. He expired on the night of the 17th May, so gently that his neighbours in the ward were not aware of the event until it was discovered by one of the nurses. He had not been out of bed for three or four days, and on the day preceding his death complained of the pain being more than usually severe. It was found on dissection that the joints between the occiput and atlas were carious; that the ligaments connecting the *processus dentatus* to the margin of the *foramen magnum* were destroyed; and that the process had thus been allowed to press backwards out of its place until the space afforded for the passage of the spinal cord did not exceed a quarter of an inch in width from before backwards.

The disease of which this case affords an example is in many respects extremely interesting and important. It is very obstinate, but not necessarily fatal, as appears from preparations showing anchylosis of the bones affected without any remaining trace of caries. In reference to medico-legal questions it is of consequence to notice the extreme emaciation and weakness, peculiar expression of countenance, and fixture of the head, which attend the disease, particularly in its advanced stage. The patient always keeps his head either *quite erect* or *quite horizontal*, and never moves it without the support of both his hands. It is also of importance, with the same view to remark, that the *processus dentatus* is very rarely fractured in this disease, being almost always merely dislocated.*

A curious circumstance connected with this disease is the absence of paralysis, which circumstance is so constant that it may be regarded as characteristic. Considering the proximity of the *medulla oblongata*, it seems surprising, that while caries in other parts of the vertebral column is so generally accompanied by paralytic symptoms, they should be wanting here, especially as the displacement which results from the disease, and consequent compression of the spinal cord, are greater than at any other part. Mr Lawrence thinks that the dislocation of the *processus dentatus* could not exist without producing signs of compression, and conceives that the position in which it is found on dissection must be produced immediately before death.† But we know that the nervous substance has great power of enduring gradual pressure, and of accommodating itself to the containing cavity. And the appearances which I have repeatedly witnessed in dissecting cases of this kind would lead me to believe that the dislocation occurs gradually. I have preserved one preparation in which it must have happened long before death, as the atlas and dentata are firmly anchylosed in the position they assume on such occasions. It may be added, that the palsy connected with vertebral disease does not seem to depend upon pressure, as it occurs where the spinal canal is not altered in capacity or direction, and yields to remedies that cannot produce any alteration in these respects. As an example of this, I may select a case which I saw along with Dr Beilby. The patient was a boy about 7 or 8 years old, who had for many months exhibited the most unequivocal symptoms of disease in the dorsal vertebræ. He was confined to bed without the slightest command over his inferior extremities, which were rigid and extended, unless when spasmodically contracted. There was a large abscess in the back. The actual cautery was applied on each side of the spinous processes of the affected vertebræ, and in two days the voluntary use of the limbs was completely regained. The patient progressively improved, and the last time I saw him he was running about with other children in the country.

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* On the trial of Robert Reid for the murder of his wife, before the High Court of Justiciary on the 29th of June last, it was stated by one of the witnesses for the prisoner, Dr Robertson, that, "Within this last fortnight it has occurred in the medical wards of the Royal Infirmary that a patient walking in the wards suddenly dropped down dead, which, he is informed, arose from fracture of the *processus dentatus*, the fracture being spontaneous, and the patient dead before reaching the floor." (Account of the Trial, published by Authority, p. 39.) If Dr Robertson referred to the case which has been related above, and I am not aware that there was any other to which he could refer, it will be seen that he has not been correctly informed in regard to it; and I think it right to notice this, lest the case should be again quoted in the decision of similar questions.

† Med. Chir. Trans. xiii. p. 412.

It does not seem possible at present to explain the difference of symptoms in question, but it may assist the diagnosis of diseases in the cervical vertebræ. There are at present in the hospital under my care two cases very illustrative of this. In one of them, the articulation between the occiput and atlas is affected, and in the other the vertebræ at the middle of the neck. In the former, with the exception of the peculiar stiff position of the head, there is nothing remarkable in the patient's attitude or movements, while in the latter, though the head can be moved with perfect facility, and presents a perfectly natural appearance, the whole body, from the middle of the neck downwards, is extremely stiff and awkward from imperfect paralysis.

Caries of the Os Calcis—Excision—Recovery.—William Malloch, aged 12, was admitted on the 6th of August. On the inner side of the left heel there were two openings about an inch distant from each other, which allowed a probe to enter the substance of the *os calcis* nearly to its centre. He had suffered from the disease for fourteen months, and was prepared to suffer whatever might be deemed requisite for its removal. As the sinuses opened very close to the posterior tibial artery, and consequently not far from the articulation between the *os calcis* and *astragalus*, I feared that it would not be possible to perform a radical operation except by amputation, but considered it right to try what could be done, with the view of rendering this extreme measure unnecessary.

Having made an incision about two inches in length, parallel and very near to the posterior tibial artery, I cut from the centre of it towards the tuberosity of the heel. The flaps thus formed were reflected so as to expose the *os calcis*, a large portion of which bounding the carious cavity was removed by cutting-pliers. The gouge was then freely used to scoop out the bone until the surface presented by it, when carefully sponged and examined, appeared perfectly free from disease. No bad symptom followed, the wound quickly contracted, and the patient was dismissed on the 9th of September. He now seems to be quite sound, as the cicatrix is firm, and the foot bears every kind of exercise without uneasiness.

Partial Amputation of Foot—Secondary Hemorrhage—

Recovery.—A—— P——, aged 12, applied at Minto House in the beginning of May on account of a carious affection of the foot, which had existed for more than two years, and latterly reduced her general health to a very great degree. Her friends were willing that the foot should be amputated; and it seemed at first that nothing less severe would be sufficient for her relief, the whole of the tarsus being apparently implicated in the disease. By carefully examining the different sinuses, however, I ascertained that the joints between the *tibia* and *astragalus*, and *astragalus* and *os calcis* were sound, and therefore saw no objection to Chopart's operation, since, if any part of the disease were left by it, there would be plenty of room for its removal.

This proposal was carried into execution on the 20th of May. The articulating surface of the *os cuboides* was divested of cartilage and apparently dead, and the corresponding surface of the *os calcis* was discoloured. I thought it right to remove this portion, and easily did so with a strong knife. There was then nothing left in the stump at all suspicious. Fig. 3, Plate II. shows the bones of the foot after maceration.

Every thing went on well for a few days after the operation, but the wound bled occasionally during the following week. One of my pupils who had charge of the patient was repeatedly sent for on account of hemorrhage, which on his arrival he either found had ceased, or readily arrested by the application of cold. Thinking it necessary to interfere more effectually, as she had become extremely weak, and quite exsanguine in appearance, I separated the flap, and perceived arterial blood issuing from a point, which proved to be a crevice in a small tough white bag about the size of a large pea. Regarding this as a recent fibrinous formation, I tore it away with forceps until nothing was left beyond the mouth of the vessel to which it adhered, viz. the external plantar. Graduated compresses and a bandage were then applied. The cure met with no farther interruption; and the patient soon regained her strength.

It used to be alleged in objection to this operation, that the extensors of the heel being left attached, while the tendons of the flexors of the ankle were cut across, the stump would be pointed downwards, and rendered useless to the patient. Happening about twelve years ago to see a case at Göttingen, in which Langenbeck had recently operated, and understanding that he had done so previously on several occasions, I particularly inquired whether this inconvenience was experienced. Having been assured that it had not, I concluded that the objection was theoretical, and not founded on experience, and resolved that it should not deter me from performing the operation in any case that might require it. I have accordingly operated six times with perfect success. In relating several of these cases in the foregoing reports, I took occasion to notice the objection which seemed to have prejudiced the profession against the operation, and endeavoured to remove it, as well by explaining that the tendons when divided acquired new attachments to the neighbouring parts, as by stating the facts that the stump was not rigidly extended, but remained completely flexible under the patient's control; and that, so far from being useless, it allowed walking and other kinds of progressive motion to be accomplished without deformity or lameness. At the meeting of the Association for the Promotion of Science in Edinburgh in September 1834, I showed that a patient who had suffered partial amputation of the foot four years before could walk without perceptible defect, and move the stump at will.

Having thus endeavoured to vindicate the operation from an unjust prejudice, and establish its utility in practice, I read with regret the following report of the proceedings of the Medical Section of the British Association for the Advancement of Science at the Dublin meeting: "Mr Whatton (of Manchester) read a most interesting paper 'on partial amputations of the foot.' After an admirably drawn up memoir on the former modes practised in France and England, and some strictures on those known as Chopart's and Hey's operations, in which, from the removal of the attachments of the tendons of the principal muscles of the leg, and the aponeuroses covering them, those muscles were rendered completely useless for the purposes of progression; and though the heel remained, the limb was scarcely so serviceable as a wooden leg. Mr Whatton proposed and entered into a minute detail of the longitudinal operation, which be had been long in the habit of performing; and as evidence of its complete success, and the advantages attending it, he presented to the section a patient on whom he had so operated. The man walked stoutly without even a halt, could stand with ease on the imperfect foot, and seemed to suffer very slight inconvenience from the loss he had sustained, though in this case the three outer toes and metatarsal bones, the third cuneiform and cuboid bones, and a portion of the *os calcis* were removed. Mr Whatton exhibited casts taken from the foot at different periods after the operation, which, at the request of Professor Harrison, he presented to the Museum of the Royal College of Surgeons in Ireland.

"Dr Granville expressed his high admiration of the operation so admirably detailed, and proposed a resolution expressive of the particular approbation and thanks of the section, with a request, that the author of it would not wait for the formal volume of the Transactions of the Association, to publish such an admirable and useful operation, for the benefit of the profession and the community.

"Mr Carmichael, as the senior of the profession in Ireland, present begged leave to second the motion, and bore witness to the very inconvenient and almost useless condition of the limb, after the transverse operation of Chopart had been performed; he did not hesitate to characterise Mr Whatton's operation as one of the most important improvements introduced into modern surgery."*

I hope it is unnecessary to say any thing farther in addition to what has been already stated, in order to show that the objection thus revived, however specious in theory, is not supported by experience; and the profession will, I trust, be proof against the hasty judgment of the Medical Section of the Dublin meeting. The operation which Mr Whatton advocates cannot be regarded as a substitute for the one he condemns, since in the cases that require the latter to be performed, the foot is diseased from one side to the other. The principle of removing part of the tarsus along with diseased metatarsal bones has been so long established, that it would be difficult to discover who had the merit of originating it. But the particular operation which Mr Whatton relates has been already so fully described and illustrated by Mr Aston Key,† (Figs. 1 and 2, Plate II.) that I am at a loss to understand how any claim to the merit of originality on account of it should at this time have been either advanced or conceded.

Dislocation of the Thigh Bone into the ischiatic notch—reduction on the thirteenth day after the accident.—Lawrence Smith, aged 18, was admitted on the 10th of July, soon after having fallen from the roof of a house, four stories high, where he had been painting a window.

He lighted on the pavement, and appeared to have struck the small of his back, where a slight discoloration was next day perceptible. At the time of admission, he had not the command of his inferior extremities, and could not evacuate either the bladder or rectum. He was bled, and next day cupped on the loins, which were afterwards fomented. Under this treatment, he soon regained the power of performing his evacuations, and moving his limbs, but still complained of great pain in the back, and could not alter his position in bed without much difficulty. Thinking that his complaints depended on concussion of the spine, I abstained from farther interference, in expectation that the remaining part of his recovery would be completed by the resources of the system.

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* Athenæum, August 29, 1835, p. 665.

† Averill's Operative Surgery, second edition, 1825, p. 184.

On the thirteenth day after the accident, wishing to ascertain what progress he had made, I desired him to try to get out of bed. He did so, and then presented an appearance of the right hip, that immediately suggested the suspicion of dislocation, which was confirmed by a careful examination of the joint. The limb when left to itself was slightly shortened and inverted, the hip and knee-joints were both a little bent, the hip appeared rounder than natural, and the head of the bone could be felt at the margin of the sciatic notch. By gentle extension the foot could be drawn nearly, if not quite to the same length as the other, and the toes could be turned outwards until their direction was straight, but not any farther than this. When freed from restraint, the limb immediately resumed its former position. The thigh bone could not be brought into the same line with the trunk, and when this was attempted by pressing it down upon the bed, the patient arched his back, which in its turn could not be depressed until the thigh was allowed to rise.

The patient was carried into the operating room, and laid upon a mattress on his sound side. A folded sheet was drawn under the injured thigh, with a small hair-cushion interposed between it and the perineum and fastened to the wall. Pulleys were attached by means of a skein of worsted to the middle of the thigh, so as to act in the direction which it assumed from the dislocation. I then placed a towel under the thigh, to elevate the head of the bone at the proper time, and held the ankle in my hand to effect the necessary degree of rotation. Extension had not been made for more than a minute, when the bone returned into its place. All the symptoms of the injury immediately disappeared, and the patient was soon dismissed quite well. A useful lesson may be drawn from this case as to the danger of overlooking dislocations in circumstances not particularly directing attention to their existence, and more especially when we can account satisfactorily otherwise for their symptoms. On this account, and also because, as Sir A. Cooper has remarked, "this dislocation is the most difficult both to detect and to reduce,"* I have related it fully.

Fracture of the lower Jaw at the symphysis.—" Jamais la fracture n'a lieu dans le point central de la longueur de la mâchoire appelé symphyse du menton."† I have recorded in a former report an imperfect exception to this rule of Boyer's, in the case of a man whose jaw was broken obliquely from the symphysis to one side.‡

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* Sir A. Cooper on Dislocations and Fractures, p. 68.

† Boyer, Traité des Maladies Chirurgicales, Tom. iii. p. 124.

‡ Sixth Report, February 1831.

Peter Kellie, aged 28, was admitted on the 27th of May, on account of fracture of the lower jaw, which was seated exactly at the symphysis, and extended perpendicularly downwards between the two front incisor teeth. It had occurred three days before from a blow with a fist. There was hardly any tendency to displacement, and the treatment was consequently very simple.

Fracture of the Tibia at its tuberosity, and Fracture of the Fibula, with dislocation of the foot backwards.—James Docherty, aged 34, while unloading a ship at Leith, on the 28th of July, was knocked down by a paving stone, and suffered fracture of both legs. The left tibia was broken just below the attachment of the ligament of the patella, so that the knee could not be bent without causing displacement of the broken surfaces,—the upper one during flexion being drawn forwards by the extensor muscles. There was great effusion into the joint, popliteal space, and the neighbourhood of the fracture. The limb was maintained in a straight position by a splint and foot board, and the swelled parts were kept moist by an acetate of lead lotion.

The right fibula was broken about two inches above the ankle, and the foot was dislocated backwards, causing a remarkable projection of the heel and shortening of the instep. The apparatus recommended by Dupuytren for this injury, viz. a cushion extending from the calf of the leg to the heel, and a splint passing over it, attached to the limb at both extremities, so as to press the displaced bone into its proper position, was tried without success. The cushion and splint were therefore placed on the front of the leg, and then no difficulty was experienced in keeping the foot forwards.

The occurrence of two such unusual injuries in the same person and at the same time is remarkable. It is only in fractures of the tibia near the tuberosity that a straight position of the limb is proper. In all other cases this position is not only unnecessary, but hurtful, by preventing relaxation of the gastrocnemii muscles, which can be effected only by bending the knee and placing the limb on its side or on an inclined plane. The practice introduced by Dupuytren for treating fractures of the fibula with displacement of the foot outwards, is so efficient that it seems unlikely he would have departed from its principle in treating that more unusual form of the injury in which the foot is dislocated backwards, without some good reason. I have therefore repeatedly tried the method he recommends, but always without success, and have no hesitation in recommending as preferable the plan which was pursued in the case that has just been related.

Compound Fracture—Recovery.—John Hodge, aged 35, collier, arrived at the hospital on the 4th of August, in a hearse, in which extraordinary conveyance he had travelled upwards of twenty miles, having been brought in it across Queensferry from near Kinross. He had suffered a very bad compound fracture of the leg fourteen days before, from the fall of a heavy stone, attended with such shattering and denuding of the bone, as, in the opinion of his medical attendant and another gentleman who joined him in consultation, rendered amputation advisable.

I found on examination that the fracture was comminuted and very oblique, that the upper extremity of the tibia projected through the wound, and that a considerable portion of the same bone was detached from the shaft. In other respects the case had a favourable appearance locally as well as generally, and I felt encouraged to confide in the goodness of the patient's constitution, by the strength of mind he had displayed in effecting his transport to the hospital by means of a carriage, which, however convenient for the purpose, would have been rejected by most people from the disagreeable feelings associated with it. Having made an adequate enlargement of the wound, I sawed off the projecting end of the tibia, and removed the detached portion of it, which was nearly three inches in length, but not more than half-an-inch thick. The limb was then laid upon an inclined plane, and properly secured with splints and bandages. The patient made a good recovery, and has retained a leg perfectly straight, and equally long with the other one.

Tumour of the Tibia—Amputation—Recovery.—Robert Thompson, aged 18, from Carrington, was admitted on the 14th of July on account of a large swelling of the left leg. It was situated immediately below the knee, and seemed to depend upon an irregular enlargment of the head of the tibia, occupying the ham, and projecting on both sides in front. Its consistence was soft, and unless when carefully examined, might have been supposed to fluctuate. The patient was thin, and of an unhealthy complexion. He stated that during the months of February and March last, he had twice suffered a bruise of the affected knee, by falling in the first instance from horseback, and afterwards from a cart. The first of these injuries was followed by little inconvenience, but the second immediately occasioned pain and swelling, which never ceased. The tumour increased slowly at first, but more rapidly since May, and of late had been enlarging very rapidly, with a corresponding increase of pain.

As this was evidently a case of malignant growth, amputation appeared the only remedy, and was accordingly performed at the middle of the thigh on the 17th. The patient made a good recovery, and was dismissed quite well on the 12th of September.

The tumour when displayed by dissection presented the characters of the medullary sarcomatous structure in its most perfect form, the morbid substance completely resembling brain, except in being at some parts of a more dark or bloody appearance. The bone when macerated was found to have sustained comparatively little alteration. The growth had proceeded from its surface, the part of which corresponding to it was smooth and dead looking, surrounded by an irregular depression or groove from absorption. Beyond this there was an inconsiderable effusion of new osseous substance.

The first observation which occurs to me in regard to this case is the frequency of medullary growths from the upper head of the tibia, and the extreme similarity in the external form of the tumours which they constitute. I have amputated three limbs for swellings of this kind, which I really believe could not have been distinguished from each other, either before or after dissection. The reason of this resemblance is probably, that the soft texture of the disease accommodates itself to the resistance which the surrounding muscles oppose, and extends chiefly in those directions where they yield most readily to its enlargement.

In last Report I noticed the truly hopeless nature of operations performed for the removal of cerebriform growths proceeding from the eye-ball, and therefore think it the more necessary now to remark the comparatively favourable result of amputation for similar diseases of the extremities. From my own opportunities of observation, I should say that the tendency to reproduction of such tumours was greatest in the eye, next in the skin, then in the mamma, and least in the testicle and bones. It is impossible at present to account for the difference in this respect, but it unquestionably exists, and ought not to be lost sight of in practice. It would be no less difficult to explain some other peculiarities presented by the disease in different situations, as for instance the slowness to fungate which characterizes it when affecting the testicle. There is in my possession one weighing four pounds and a-half, which I removed from a gentleman who had had it repeatedly punctured, under the erroneous impression on the part of his attendants, that the swelling depended on accumulation of fluid. Though thus irritated for many months, it simply enlarged, without showing any disposition to fungous excrescence.

Laceration of the Arm—Amputation—State of the Vessels. —That torn arteries generally bleed little or not at all, has long been very well known, but the cause of this fact is not yet satisfactorily ascertained. The most probable explanations of it are, 1*st*, that the internal coats are irregularly lacerated owing to their greater friability, and coiled inwards so as to obstruct the vessel and promote coagulation; 2*d*, that when an artery is extended, the internal coats give way before the tough external cellular one, which hence collapses in a conical form at each extremity of the ruptured vessel; 3*d*, that both of these events take place and co-operate to produce the effect in question. As it is only by recording well-marked cases of their occurrence, that the proportionate frequency of these processes, and their respective share in arresting hemorrhage can be established, I am happy in being able to relate the following very distinct example of the second one.

John Mackie, aged 40, was brought up from Leith to the Hospital on the evening of the 21st of August, on account of an injury of his arm, which had been inflicted by a machine for grinding bark. From the elbow to the wrist, on the palmar side of the limb, the integuments were removed, the muscles were exposed, separated from each other, and at various parts torn across, and the ulna was broken into small pieces hardly exceeding an inch in length. In these circumstances there could be no doubt as to the necessity of amputation, which was immediately performed above the elbow.

Though it was stated that little blood had been lost at the time of the accident, it seemed impossible that both of the principal arteries of the fore-arm could have escaped rupture, and consequently there appeared a good opportunity for observing how the lacerated nature of the injury had prevented hemorrhage. The radial and ulnar arteries were, therefore, carefully traced down from the humeral, when it was found that the former pursued its course entire to the wrist, but that the ulnar was torn through about the middle of the arm. The lower end of the vessel lay exposed to view among the lacerated muscles and tendons. It seemed larger than natural, and as if distended by coagulated blood near the extremity, which was of a conical form, with a slender thread-like extension from its apex about an inch in length. The upper end lay more deeply imbedded under the origins of the flexor muscles; but when dissected out, presented the same appearance as that just described. *Vid.* Fig. 3, Plate I. When the vessel was slit open, its internal coat appeared quite sound until it reached the clot, which was about three quarters of an inch from the extremity, but at this point both internal and middle coats were abruptly divided as if by a knife. The conical termination having this part for its base, was formed entirely of the external or cellular coat, and adhered firmly to the clot contained. It would appear, therefore, that in this case hemorrhage was prevented entirely by extension and subsequent collapse of the external coat, and not at all by tearing and turning inwards of the internal ones.

Fracture and Laceration of the Arm—Amputation at the Shoulder-Joint—State of the Artery.—William Little, aged 50, was admitted on the evening of the 15th of September, almost immediately after suffering a very severe injury of the right arm from the machinery of a distillery, at which he was employed. The humerus was fractured close to the neck, and also lower down. The muscles on both sides of the bone were torn through in different places, and the whole arm from the elbow to the shoulder was bruised and lacerated. In these circumstances, amputation, being plainly the only resource, was performed at the joint,—the state of the soft parts not allowing any part of the humerus to be retained. The disarticulation was effected by transfixion,—the knife in the first instance being entered midway between the acromion and coracoid processes, directed downwards and backwards so as to pass through the joint, and then brought outwards and forwards to form a flap. It was next carried round the head of the bone inwards and forwards, so as to form a second flap answering to the first one. The arteries having been tied, the edges of the wound were stitched together, and covered with cold wet cloths. In the course of a few days union by the first intention appeared to be nearly complete, but a discharge of matter afterwards took place from one or two small points which had not healed, and still continues to a smaller extent.

The humeral artery was found quite detached from its neighbouring connections for the space of four inches, but did not seem to be ruptured or lacerated. It looked larger, and felt firmer than natural; and when laid open was found quite entire, but showed a clot lining its cavity to the extent it had been denuded. This clot, I need hardly observe, must have been formed previously to amputation, since the fluid blood contained in the vessel would certainly flow out upon its division. Its existence, therefore, must be attributed to the injury which the artery had suffered, and affords a good illustration of the effect which external violence produces on the contents of the blood-vessels.

Nævus of the upper Eyelid—Removal by Ligature.—Agnes Dyer, aged 12 months, from Dalkeith, recommended by Dr Renton, was admitted into Minto House on the 9th of September, for the removal of a large nævus. It occupied the whole of the left upper eyelid, and hung down over the eye so as to conceal it from view in front. The tumour was of a dark colour, and presented in other respects the usual characters of venous erectile tissue. It had been first observed six weeks after birth, and was rapidly increasing. As the disease extended from the eyebrow to within a line of the roots of the eyelashes, it was feared that the contraction consequent upon either excision or ligature would cause eversion of the eyelid; but this seemed a smaller evil than the existing, and still more the aggravated state of the case, which might be expected from the activity of the morbid action, if allowed to proceed unchecked. It was, therefore, resolved to operate, and by ligature, as the part affected was favourably situated for this method, while excision appeared likely to occasion troublesome hemorrhage.

A strong silk thread was passed through the root of the tumour so as to divide it into four different portions, each of which was effectually strangled by the ligature surrounding it. No bad symptoms followed. The swelling became black, shrivelled, and fell off on the fifth day. The raw surface healed kindly, and, contrary to expectation, cicatrized without eversion of the eyelid.

Nævus resembling a fatty Tumour—Removal by Excision. —Agnes Brown, aged 4 years, was brought to Minto House, on the 19th of August, on account of a tumour seated over the lower part of the back of her neck. It was round and flat, about two inches in breadth, and having the lobulated shape, as well as peculiar consistence, of an adipose growth. The surface was not altered except at the centre, where, for about the extent of a half-crown piece, it was white and depressed. This appearance resembling a cicatrix was attributed to the effect of inoculation with vaccine matter, which had been practised twelve months before. It was stated, that the tumour first attracted attention when the child was nine months of age. I afterwards ascertained that the swelling previous to vaccination had a purple colour, and that subsequently there had been a remarkable diminution of size. The tendency to enlargement again returning, had rendered the tumour larger than ever, and was rapidly increasing it. Not being aware of these latter circumstances at the time, I concluded that the disease depended merely upon an adipose tumour, and proposed excision, which was readily acceded to.

On making a free incision through the integuments and morbid growth, I was surprised to see arterial blood springing out in numerous jets, but having then discovered the true nature of the tumour lost no time in completing its removal. So soon as this had been accomplished, the bleeding was restricted to one large vessel, which showed its open mouth on the surface of the fascia. A ligature having been applied, the edges of the wound were stitched together. Union by the first intention did not take place, but the wound healed kindly by granulation. The tumour, though in some parts vascular, was in general quite similar to the ordinary adipose structure, and was deemed such by several of my practical friends who examined it. This case affords a useful lesson; since, if the tumour had been less easily removeable or the child younger, serious consequences might have attended the error of diagnosis in regard to its nature.

Nævus of the Scalp—Removal by Excision.—A child aged 12 months, from Dunbar, was admitted into the hospital on account of a vascular tumour growing from the scalp near the vertex. It was of the size of a large strawberry, which it resembled in colour and form. It had appeared when the child was 3 weeks old, and was increasing. As the morbid growth, even though it were to become stationary, could not fail, from its situation, to become extremely inconvenient, and even dangerous, there could be no doubt as to the propriety of its removal, which was readily effected by excision, the wound healing almost entirely by the first intention, so that the child went home a few days after the operation.

I have mentioned this case as affording an example of the circumstances in which excision is more convenient for the removal of erectile tumours than the ligature. The former method should be preferred when it can be executed without the risk of serious hemorrhage, and without taking away so much of the integuments as to prevent union by the first intention, because it is effected more quickly, with less pain, and leaves a smaller cicatrix. I have frequently cut out tumours of this kind from the face with hardly any perceptible mark, while the ligature must always leave one. It has been thought that a narrow base or neck was a reason for resorting to the ligature; but in general the rule should be reversed, and the ligature restricted to those cases in which the attachment of the disease is so extensive as to forbid any expectation of the wound necessary for its excision healing by the first intention.

Fibrous Tumour of the Breast—Removal.—Mrs Smith, aged 21, was admitted on the 17th of July, for the removal of a tumour in her right breast, which had been first observed about three years before, and was increasing with progressive rapidity. It was of firm consistence, and very unequal surface, but quite distinct from the surrounding tissues. It occupied the situation, and was about the size of the mammary gland. The operation was performed in the usual way, and the patient was dismissed on the 8th of August.

The tumour when dissected presented an appearance different from what had been expected, and of an unusual kind. It possessed the firm consistence of the ordinary fibrous tumour of the breast, the chronic mammary tumour of Sir A. Cooper, but instead of constituting a single mass with botryoidal or nodulated surface, it was composed of many distinct masses closely connected together towards the centre by cellular substance, but more loosely at the circumference, where there were some small masses nearly quite detached. This description agrees with that of Mr Abernethy's tuberculated sarcoma, so far as the structure is concerned, but differs from it in regard to the seat of the disease, which was not in the lymphatic glands, and in the absence of malignant action, which he attributed to that formation. Sir A. Cooper has not mentioned the tuberculated sarcoma as occurring in the mamma or its neighbourhood, and, on the whole, I am inclined to consider the growth in question as merely a modification of the ordinary fibrous tumour.

The most remarkable example of this very common affection which has come within my observation, occurred in the hospital the summer before last, and having been omitted in the former reports, may be mentioned here. The patient was Janet Macdonald, aged 66, a woman of small stature, but apparently healthy constitution, who, for the long period of thirty-five years, had laboured under a tumour in her breast. At the commencement of her complaint, she consulted the late Mr Benjamin Bell, and had frequently been advised to have the disease removed, but as it did not until lately grow so large as to prove seriously troublesome, she declined any interference. During the twelve months preceding her application to me, the activity of the morbid growth became greatly increased, and the tumour in consequence attained a size and weight which rendered it insufferably oppressive. The operation was performed without any difficulty, and the wound healed by the first intention. The mamma, greatly attenuated, was spread over the lower part of the tumour, which weighed between seven and eight pounds.

Strangulated Inguinal Hernia—Operation—Recovery.—Samuel Lloyd, aged 19, was admitted on the evening of the 25th of October, labouring under a strangulated scrotal hernia of the right side. He stated that the rupture had existed from infancy, but seldom given him much trouble, seldom protruding, and being in general easily reducible. The symptoms commenced about 5 P. M. after a long walk, and were extremely severe. The efforts to vomit were incessant, the abdomen was much distended, and he complained of intense pain here as well as in the tumour. He had injections repeatedly administered, was put into the warm bath, and lost twenty ounces of blood from the arm. Reduction was carefully tried again and again without success, and at 2 A. M. next morning, it appeared to my colleagues and myself that any farther delay would be unsafe.

Having opened the sac, I found a complete loop of intestine, the ileum, and a large portion of omentum. I divided the stricture freely, directly upwards, and returned the bowel. The omentum adhered to the extent of about half an inch to the sac at its neck, but was otherwise seemingly quite unaltered in texture. I therefore divided the adhesion, and returned it. The *tunica vaginalis* containing the testicle was entire, and did not constitute the sac. The patient had a threatening of inflammation in the course of the day, which yielded to leeching and fomentation. His bowels were freely evacuated, and he gradually became free from all uneasy feeling. The wound healed by the first intention, and he was dismissed on the 16th of November.

This case illustrates two points of considerable practical importance, viz. the advantage of dilating the stricture very freely when the protrusion is large, and the propriety of not cutting away the omentum when it is sound. The great danger of large intestinal hernia is inflammation, and of course the risk of this will be increased by forcible handling of the bowel. But when the stricture is divided merely to such an extent as would permit the intestine to be pushed through it, provided no resistance was opposed to it from within, reduction always proves difficult and laborious. Therefore, though a very slight enlargement may be sufficient in small ruptures, as those usually met with in the femoral opening, the enlargement should be more than proportionally free, when the quantity of intestine is of any considerable size. When the omentum is thickened and indurated, its return into the abdomen would be not only difficult, but, if effected, in all probability injurious. Excision of the redundant part is therefore not only warrantable, but necessary. If its texture remains sound, there is not the same objection to reduction, and the cut surface, from bleeding more freely, might require the application of so many ligatures as would greatly increase the danger of inflammation.

Tumours of the Groin and Scrotum—Removal.—James Jack, aged 43, recommended by Mr Guthrie of Brechin, was admitted on the 1st of August, on account of a large swelling, or rather two swellings which occupied the left groin, and the same side of the scrotum. Fig. 3, Plate II. The inguinal tumour was of an oval form, being 14 inches in length, and 10 in breadth. It presented the external characters of a medullary growth, having a reddish colour, an irregularly nodulated surface, and a soft almost fluctuating consistence. The scrotal enlargement had the appearance of an inguinal hernia, and its consistence was not unlike that of an old irreducible epiplocele, but, when carefully examined, it was found to depend on a morbid growth of the part itself. The tumour was distinctly defined in the perineum, and readily recognized to be an adipose sarcoma or simple fatty swelling. The testicle could not be distinguished by external examination, but was felt by the patient when subjected to pressure, and seemed to be about the centre of the enlargement. The tumour of the scrotum had existed about three years, and that of the groin eighteen months. They were both increasing, particularly the latter one, which was also painful, and had ulcerated superficially to a small extent at one of the most projecting parts.

On the 4th of August, I removed the inguinal tumour by making two semilunar incisions, so as to include a sufficient portion of integuments, and then carefully dissecting it out. It was firmly bound down by layers of strong fascia, and adhered closely to the great vessels of the groin, but being surrounded by a dense smooth capsule was taken away quite entire. I then made an incision from the lower part of the perineum upwards, in the course of the raphe to the external ring, and another transversely from its centre to join the former incision. The flaps thus formed were dissected aside, so as to display the nature and connections of the scrotal tumour, which proved to be, as had been supposed, a simple fatty growth, but inseparably adherent to the testicle and cord, which lay completely imbedded in it. The upper part of the tumour was turned down to expose the cord, at its exit from the external ring, where the vessels were divided and held until the removal of the tumour was completed. The arteries were then tied, and the edges of the different incisions stitched together. The patient suffered no bad consequence, was able to walk about in a fortnight, and went home on the 2d of September.

The tumours weighed together four pounds nine ounces, the one from the groin being three pounds one ounce, that from the scrotum one pound eight ounces. When a section was made through the former, instead of the medullary structure existing alone or together with cysts, which had been expected, it displayed a uniform mass of adipose substance, inclosed in a very strong dense capsule, which by its tension had prevented the true nature of the case from being recognized. The scrotal swelling presented the appearance of several distinct fatty tumours, but they were found to be all connected together. The *tunica vaginalis* contained no fluid, and adhered at part of its extent to the testicle. This case seems interesting from the deceptive appearance of the morbid growth, which in the scrotum so closely simulated hernia as to have been considered of this nature, and in the groin resembled a medullary tumour so perfectly, as to deceive myself and colleagues who examined it.

Hydrocele extending up to the internal opening of the Inguinal Canal—Injection—Recovery.—Alexander M'Culloch, aged 22, was admitted on the 13th of March on account of a hydrocele of the right side. The tumour presented no unusual appearance except a slight fulness of the inguinal region, and the usual characters of the disease, viz. insensibility to pressure, fluctuation and translucency were very well marked. But when the patient assumed the horizontal posture, it was observed that the scrotal swelling became much less tense, and could with very slight pressure be completely transferred upwards, so as to leave the testicle uncovered by fluid. When this was done, the inguinal enlargement became much increased and more tense, and could be distinctly felt extending to the peritonæum. It was affected by coughing very remarkably, and indeed more so than hernial swellings usually are.

Though two of the most characteristic features of hydrocele, viz. non-displacement by pressure, and non-disturbance by coughing were thus absent, there could be no doubt in regarding the case as of this nature. And as the disease had not been congenital, having existed only for three years, the peculiarities which have been mentioned seemed explicable, by supposing that the neck of the *tunica vaginalis*, by becoming obliterated merely at the inner opening, allowed the water to ascend higher than usual. The operation by injection was, therefore, performed in the ordinary way, and promised to be successful from the effects which followed it. But when the cure seemed to be completed, it was found that if the patient placed himself in the erect posture, a small quantity of fluid descended from the inguinal part of the sac, and before long the water proceeding from this source increased so much, as to restore the complaint very nearly to its original state.

It then occurred that the wine injected had not sufficiently affected the upper portion of the *tunica vaginalis*, and the operation was repeated so as to obviate this imperfection. After the injection had been thrown in, the patient was laid horizontally to allow it to flow up to the full extent of the cavity, and thus exert its influence over the whole surface,—a method which seemed safer than attaining the same object by forcibly distending the cavity by injecting a larger quantity of wine. The result proved completely successful, and the patient was dismissed cured.

Cancer of the Penis—Amputation—Recovery.—John Gow, aged 56, was admitted on the 2d of June. The penis in the situation of the glans was considerably swelled, irregular in form, and extremely hard. The indurated part projected on both sides, so as to give a flattened appearance to the organ, but the orifice of the prepuce was so small that the state of the swelling inclosed could not be at all observed through it. In the right groin there was a moderately large, fixed, and very hard glandular swelling. The patient complained of occasional lancinating pain in the penis and uneasiness in the groin. He stated that in October last he felt difficulty in voiding his urine, and observed that the prepuce, which formerly could be readily and completely retracted, was somewhat tightened at the orifice. Soon afterwards a swelling commenced at the neck of the glans, which gradually increased in extent and hardness, and about the middle of January became painful at times. The enlarged inguinal gland, he assured us, had existed for at least four years, but of late had considerably increased.

The prepuce was slit open, in order to ascertain the state of the glans more fully, and at the same time remove the effect of any irritation that might be caused by the contraction of its orifice. Acetate of lead lotion was then applied to the swelling, and leeches with warm fomentations were employed to discuss the inguinal tumour. A marked improvement followed this treatment, and it was hoped that the formidable aspect of the disease might have proceeded entirely from the continued influence of local irritation. But it soon appeared that this favourable change was confined to the prepuce, and that the glans remained as hard and irregular as ever, while the patient still complained of lancinating pain. In these circumstances the carcinomatous nature of the complaint could not be doubted, and the removal of the disease promised little benefit in the existing condition of the inguinal gland. I was, therefore, satisfied with continuing to use merely soothing measures until the 27th, when, from the repeated occurrence of hemorrhage to the extent each time of half a pint or more, it seemed necessary to interfere more actively.

As the induration terminated abruptly about a quarter of an inch beyond the neck of the glans, and the remaining part of the organ seemed quite sound, I resolved to amputate the penis. The operation was performed very simply, by one decided sweep with a moderate sized amputating knife, and without any previous retraction of the skin. The two dorsal arteries and the two arteries of the *corpora cavernosa* having been tied, cloths moistened with cold water proved sufficient to restrain the slight oozing of blood that still continued. The patient had not a single bad symptom, and the wound was quite cicatrized on the 20th of July, when the size and uneasiness of the inguinal swelling had greatly abated, and the general health was much improved. Difficulty then began to be experienced in micturition, from the orifice of the urethra contracting, and after trying in vain to remedy this by passing slender bougies, I dilated the aperture with a sharp-pointed bistoury, guided upon a probe, and afterwards found it easy to preserve the orifice of its full width.

Hydrophobia.—Alexander Elder, aged 28, night watchman, was admitted at half-past twelve P. M. on the 15th of September, exhibiting all the symptoms of confirmed and violent hydrophobia. Every few minutes he was seized with convulsions beginning in the face and throat, but rapidly extending to the whole body, which was frightfully contorted in all directions. At these times he emitted the most dreadful screams or yells, altogether unlike the usual expressions of suffering, and rather indicative of sudden intolerable horror. He frequently grasped his throat, and pressed upon his stomach, where he said all his distress lay. Thick frothy saliva was continually ejected on every side with great force. His countenance was strongly expressive of apprehension and despair, and his eyes had a remarkably wild bloodshot appearance. Pulse 116, full and not easily compressible. He suffered greatly from thirst, but would not attempt to take water or other fluid from a cup. When it was presented to him in a spoon he sat up in bed and seemed to concentrate his whole powers for the exertion. He eyed the spoon with a fixed gaze, as if fascinated by it, then gradually approximated his mouth, and finally, as it were, threw himself forward with a violent convulsive effort, during which it was doubtful whether he succeeded in swallowing any of the liquid or not.

It was acertained that about two months before, having occasion to destroy some of the unclaimed dogs which were proscribed at that time, he had been bitten by one of them in the hand and leg, and that both wounds had healed in the course of eight days. During the week preceding his admission, he was said to have indulged more than usual in drinking spirits, being generally of sober habits. On the 11th, he complained of pain in the hand that had been injured. On the morning of the 13th, he felt unwell, having no appetite for food, but no aversion to drink. During the following night while on duty, he was offered a glass of whisky, which he swallowed with difficulty, as he alleged from his hand shaking. Next morning, when attempting to take some tea, he was observed to grasp the cup suddenly with both hands, and although he endeavoured repeatedly to swallow its contents, he was unable to do so, from the violent spasms which were always induced by the trial. General convulsions soon succeeded, and the disease appeared to have been completely formed about this time. He was seen by Bailie Macfarlan in the evening, who administered some antispasmodics, and sent him to the hospital.

As the patient expressed a great desire to be bled, I made this be done to the extent of forty ounces, which seemed to lessen the violence, though it did not diminish the frequency of the paroxysms. Some doses of calomel were then administered, but it is doubtful whether they were swallowed. About six o'clock he said that he felt much easier, having had no spasm for fifteen or twenty minutes. The pulse at this time was rapid and small, and his breathing a little embarrassed. A few minutes afterwards the muscles of the pharynx were convulsed, and death terminated his sufferings.

On dissection, no morbid appearance could be observed except unusual vascularity of the pharynx and stomach. It may be noticed that this is the only case of hydrophobia which has occurred in Edinburgh for the last thirty years.

Art. II.—*Account of a Varioloid Epidemic which occurred in George Watson's Hospital in the summer of* 1835, *with Remarks in illustration of the Antivariolous power of Vaccination*. By Benjamin J. Bell, Fellow of the Royal College of Surgeons, Edinburgh, Member of the College of Surgeons, London, late House-Surgeon to St Bartholomew's Hospital.

It is a melancholy fact, which the experience of every day seems to confirm, that public confidence in the antivariolous efficiency of vaccination has been of late years much impaired by various untoward occurrences, the probability of which was certainly not contemplated by Jenner, and his immediate successors. These early champions of vaccination were too sanguine, it is to be feared, in their anticipations for the future; and the consequence is, that every disappointment is now viewed through a false and exaggerating medium. Hence the real and substantial benefits which this discovery has conferred upon our species, by reducing the average mortality of small-pox, are at present sadly overlooked, while an unfortunate and hurtful publicity is unavoidably given to every supposed example of vaccine imperfection.

Under these circumstances, it appears to be the duty of every one who possesses an opportunity of doing so, to assist as far as he can in removing the erroneous conceptions which are at present gaining ground. It is with this feeling that I have ventured to make public the following cases which occurred lately in George Watson's Hospital, a charitable Institution in this city for the education of boys. These cases are calculated, I think, to substantiate the true value of vaccination, and are, therefore, deserving of being made known.

I may here observe, that there were in the house at the commencement of this epidemic seventy-five boys, and that the number was kept up till the middle of July. Under ordinary circumstances, they are distributed according to their age, in four large sleeping apartments. On the present occasion, one of these was appropriated to the reception of such as became affected with the epidemic, and in the following account the boys are distinguished into classes or sections according to the apartment to which each was attached.

On the 30th of May 1835, a child of one of the servants residing within the walls of the Hospital sickened and became very feverish; and on June 2d, a vesicular eruption began to appear, which spread eventually over all parts of the body. The vesicles were numerous, particularly on the face, and had a distinct central depression; they were surrounded by a good deal of redness; they attained a very considerable size, and speedily assumed an opaque pustular appearance. The eruption, which had every character of distinct small-pox, was followed by a very marked abatement of all the feverish symptoms, and convalescence proceeded in the most favourable manner. This child, though betwixt one and two years of age, had not been vaccinated, in consequence of some foolish objection on the part of his father.

June 4th. John Mirry, aged 10, (First Section,) one of the Hospital boys, was attacked with the ordinary symptoms of small-pox, and on the 7th, a copious eruption began to show itself on all parts of the body. The vesicles, as they enlarged had a distinct central depression, with comparatively little surrounding redness; they were semi-confluent on the face and hands, and extremely numerous over the remainder of the surface. The febrile symptoms seemed to undergo little, if any, remission when the eruption made its appearance; and he sank rapidly into a state of great prostration, which required the free use of stimulants for many days in succession. Very slender hopes were entertained of his recovery; but a decided change for the better unexpectedly took place upon the sixteenth or seventeenth day of the disease, from which period he went on improving for more than a week, when symptoms referrible to the windpipe arrested this favourable progress, and carried him off upon the 6th of July.

It would be foreign to my present purpose to enter any farther into the particulars of this case, although they might suggest one or two pathological and practical questions of considerable interest.

At the period when this boy was first taken ill, I found that he alone of all the hospital boys had never been vaccinated: all the others presented cicatrices, in some large and distinct, in others smaller and less satisfactory. Besides these, there were in the house at this time fourteen other individuals, including the Masters, the Matron, and seven female servants, the porter, his wife, and their child, whose case has been already detailed. Of these, three had passed through the inoculated small-pox, and nine had been vaccinated; but the porter himself, as well as his child, was wholly unprotected.

No fresh cases occurred for more than three weeks, and there seemed reason to hope that the contagion had been arrested, when all at once several boys were seized with more or less constitutional disturbance.

June 28. John Blaikie, aged 14 (Third Section,) felt sick and uncomfortable, but did not make any complaint till the 1st of July, when a considerable number of vesicles were seen sprinkled over all parts of the body, especially over the face. These had a distinct central depression, with very little surrounding *areola*. They soon became pustular, and dried up in a few days, the constitutional symptoms having abated almost simultaneously with the appearance of the eruption. This boy, it will be seen, slept in a different apartment from Mirry. He was removed immediately to a separate room, to which the succeeding cases were also brought as they occurred.

June 29. John M'Lean, aged 15 (Third Section,) became sick, feverish, and oppressed. July 1. An eruption not unlike that of measles appeared in different parts of the body, but faded away almost entirely on the following day, when a few vesicles were observed here and there over the surface. These vesicles were surrounded by considerable redness, but did not attain any size, had no central depression, and speedily disappeared.

June 30. George Fairbairn, aged 12 (Second Section,) sickened, and became feverish in the same way as the others. On the 1st July, a measle-like eruption, exactly similar to that which affected M'Lean, made its appearance, with a few vesicles interspersed. The eruption became much fainter on the following day; no more vesicles could be detected, and those already visible dried up very soon and disappeared.

June 30. Andrew Betts, aged 13 (Third Section,) and James Dick, aged 9 (First Section,) became also slightly indisposed. On the 2d of July, a few vesicles, with surrounding redness, were observed on both of them. These, however, did not exhibit any central depression, and soon faded away.

July 1. William Mitchell, aged 13 (Second Section,) was very feverish, with headach, sickness, retching, and bilious vomiting. On the 2d July, a considerable number of vesicles made their appearance, particularly on the face. These became more fully developed, and subsisted longer than in some of the foregoing cases, but did not exhibit any central depression.

July 1. William Dick, aged 10 (First Section,) was sick and feverish. July 2. A few vesicles, with surrounding redness, were observable. These did not enlarge much, but speedily disappeared.

July 1. Anthony Matheson, aged 11 (Second Section,) was seized with symptoms similar to those which occurred in the other cases. On the 2d of July, a measle-like eruption, with a few vesicles interspersed, appeared in patches over various parts of the body, 3d. The eruption was very generally diffused, and the intensity being much increased, it might be said to bear a greater resemblance to *scarlatina* than to measles, especially on the back part of the legs and thighs, where the redness was most remarkable. This eruption faded on the following day, and the vesicles did not become more numerous.

July 2. Frederick Ross, aged 10 (First Section,) became feverish, with headach, sickness, and vomiting. 3d. An eruption of *petechiæ*, almost amounting to *purpura*, made its appearance upon one arm, and the corresponding side of the chest and abdomen, with a considerable sprinkling of vesicles over all parts of the body. This boy had been long troubled with *porrigo capitis* in a subacute form.

July 2. William Armstrong, aged 9 (First Section,) became hot and feverish, and a few small vesicles were observable, with considerable surrounding redness. These were more numerous on the following day, but soon ran their course and disappeared.

July 2. Andrew Fowler, aged 10 (Second Section,) had headach, sickness, and other precursory symptoms, which continued till the 5th, when a considerable number of vesicles made their appearance in different parts of the body.

July 2. Mr H., aged 27, one of the masters of the institution, felt languid, and indisposed for any exertion. 3d. He was feverish, complained much of headach, and kept his bed. These symptoms continued without intermission till the 5th, when a considerable number of vesicles began to appear, particularly on the chin and lower part of the face. 7th. The eruption of vesicles was now much more copious over the whole surface, but especially on the face, where they afterwards coalesced. This proved to be a case of genuine small-pox, completely unmodified, to all appearance, by previous vaccination. He grew gradually worse, sunk into a state of great depression, and died on the 13th July, on the twelfth day of the disease.

July 3. Thomas Dick, aged 12 (Second Section,) became feverish, and had an eruption resembling measles on his face, hands, knees, and feet, but all other parts of the body were entirely free from it. I believe that a few vesicular spots appeared on the day following, but cannot be certain, from having neglected to make a note of his condition.

July 3. Christopher Meikle, aged 12 (Second Section,) who slept with Anthony Matheson, had the usual preliminary symptoms, and a few solitary vesicles appeared upon the surface.

July 4. David Henderson, aged 11 (First Section,) had the usual preliminary symptoms, which were relieved on the following day by a sprinkling of vesicles over the surface.

July 4. Alexander Kinnear, aged 12, (Second Section,) of great constitutional delicacy, and subject to slight *psoriasis* of the face and leg, became very hot and feverish, complaining much of headach and general uneasiness. These symptoms continued increasing until the 6th, when a few vesicles began to show themselves in different parts of the body, with much *petechial* eruption on the right side of the chest and abdomen, similar to that which was observed in Frederick Ross. 7th. The vesicles had become much more numerous, particularly on the face, where they were slightly confluent, and on the hands and feet. They exhibited the central depression, and other characteristic appearances of genuine small-pox. The constitutional symptoms were greatly relieved by the eruption, but still continued in some degree for several days. On the 14th, the pustules on the hands were still distended and white; those on the face discharging their contents, and blackening; those on other parts of the body desiccating, and peeling off. From these and other particulars, it would appear, I think, that, in the present case, the disease ran its course scarcely modified by vaccination, although a very distinct *cicatrix* remained upon the arm.

July 4. James Dun, aged 10, (First Section,) was confined to bed with the usual premonitory symptoms. 6th. Several vesicles made their appearance on various parts of the body.

July 7. William Cleland, aged 13, (Second Section,) became indisposed and feverish. 8th. A considerable number of vesicles were sprinkled over the surface, with a measle-like eruption betwixt the thighs, and at the lower part of the abdomen.

Although one or two of the boys were slightly indisposed, no additional case of vesicular eruption occurred from this date till the end of another week.

July 14. Andrew Cassels, aged 15, (Third Section,) was feverish, and complained of headach; and on the following day a few vesicles made their appearance in different parts of the body.

On this day it was arranged by the Governors that those parents who chose to do so, might remove their boys from the Hospital, as the classes could not be carried on with any advantage under present circumstances. This permission was embraced by a large majority, so that very few boys were allowed to remain. Among these no fresh cases occurred; but four of those who left the house have since been attacked by the disease in a modified form.

William Watson, aged 14, (Third Section,) became sick and feverish within a few days after leaving the hospital. These symptoms continued for three days, when about three dozen vesicles made their appearance on different parts of the body.

Alexander Fairbairn, aged 10, (Second Section,) became indisposed at the same time with Watson, and the vesicles, which were not so numerous, showed themselves three days afterwards.

James Mirry, aged 9, (First Section,) brother of the boy who died, was attacked with the usual preliminary symptoms about eight days after leaving the hospital. The vesicles appeared on the third or fourth day, and did not exceed twelve in number.

William Allan, aged 7, (First Section,) was also attacked very mildly about the same time with the preceding boys, but his friends being at a great distance from Edinburgh, I could not obtain any additional information.

It is an interesting fact, that although the boys always sleep together two in a bed, there were only three instances in the present epidemic of bed-fellows being both attacked. These were Christopher Meikle and Anthony Matheson, John and James Mirry, George and Alexander Fairbairn. But James Mirry was not seized till six weeks after separation from his brother; and the two Fairbairns had slept in different beds for nearly three weeks before the second became ill.

There can be no doubt, I think, from the foregoing detail of cases, that the contagion of small-pox has been recently in full operation amongst the inmates of Watson's Hospital. We have, in the first place, two genuine and well-marked cases of the disease occurring almost simultaneously, and derived, in all probability, from exposure to the same infection. I have not succeeded, however, in tracing the disease to any satisfactory source; nor is there reason to believe that it was one to which these two children were more peculiarly exposed, because the first had scarcely ever been beyond the hospital gate, and the second was seldom separated from his companions. It is certainly a fact well worthy of observation, that two out of only three cases in which vaccination had been neglected, should be thus singled out from so great a number, and be attacked with small-pox within a very few days of each other. The first impression which they naturally produced was this, that previous vaccination was still exerting its influence over the constitution, and defending the rest of the boys from the variolous contagion under which these two unprotected individuals had given way. This supposition now appears to have been confirmed by subsequent occurrences, although the severe cases of Alexander Kinnear and Mr

H. may seem at first sight to weaken the evidence in its favour.

It appears from the preceding statement, that no fresh cases occurred for several weeks, when, all at once, a considerable number of boys were seized with varioloid disease. I use this appellation, because a difference of opinion is well known to exist among pathologists, with regard to the mutual relations of small-pox, chicken-pox, and those analogous cases which, occurring after vaccination, have received the name of modified small-pox. There is no doubt, I think, that many of those milder cases, which appeared in Watson's Hospital towards the end of June and beginning of July, would have been denominated by many practitioners *varicella* or chicken-pox, had they appeared by themselves at a distance from genuine small-pox; but, mingled as they were in the present epidemic with well-marked and severe cases of that disease, it is reasonable to regard them as examples of modified small-pox in individuals who had originally resisted the contagion, but who at last yielded to it when fairly developed within the walls of the institution.

Now the occurrence of these varioloid, or modified cases, instead of being calculated to weaken our confidence in the efficacy of vaccination, was absolutely necessary in the present instance for a full and satisfactory vindication of its claims. Had no other cases taken place in addition to those of the servant's child, and Mirry, the friends of cow-pox inoculation might undoubtedly have brought them forward with some feelings of triumph; but those who place less reliance in its protecting power, could scarcely have been blamed for receiving the illustration with distrust, and for regarding it as nothing more than an incidental occurrence. It might have been argued with justice, that the mere circumstance of the disease not having spread more widely is no testimony in favour of vaccination, because the same thing has taken place occasionally where vaccination could not be supposed to exercise any controlling power. In short, it is possible that solitary cases of small-pox may be met with among a number of unprotected individuals, without the disease being more widely disseminated. But this explanation will not apply to the instance before us, because these milder cases, whatever name we give them, coupled with the two severe ones, which afterwards happened simultaneously, prove beyond a doubt, that the contagion first developed in Mirry and the servant's child was still working its insidious way among those who had originally escaped.

Now it is to be observed, that these subsequent cases were not confined to any particular class or section of the boys, but occurred promiscuously among them all, showing that the whole school were equally exposed to small-pox contagion, which, though partial in its influence, was not rendered so by separation of the sick from the healthy, or by any other precautionary measure. We may conclude, therefore, upon reasonable grounds, that small-pox has been running its course epidemically amongst the inmates of Watson's Hospital, and that all those have been attacked by it in one form or in another, who were amenable to its contagious power.

We see that out of 89 individuals who were in the house at the commencement of Mirry's illness, there have been only two affected with genuine small-pox, after vaccination, while 25 have passed through the disease in a very mild or modified form. Now, having shown that the exposure to contagion was general, we are warranted in believing that a great proportion of those who remained healthy are indebted to vaccination for their escape. This supposition appears to be confirmed by what was known of small-pox contagion in former days, previously to the discoveries of Jenner. Had the disease broken out among a large number of individuals, wholly unprotected, either by a former attack of natural small-pox, or by variolous inoculation, the probability is very great, that few, if any, would have escaped its contamination. Sydenham himself, the most observing and most accurate physician perhaps of this or of any other country, bears his valuable and decided testimony to the unsparing and inveterate nature of small-pox contagion. "Integras familias contagio suo afflantes, nemini parcunt, cujuscunque demum ætatis is fuerit, nisi prius hoc morbo laboraverit." Now Watson's Hospital may be regarded as a very numerous family, where most of the members are in closest connection with each other; sleeping in the same rooms, eating at the same table, following the same occupations, and mingling in the same amusements. It is impossible surely to suppose that the statement of Sydenham would not apply with as much propriety to a large establishment like this, as to the narrower circle of an ordinary family.

It cannot be denied, that severe cases, like those of Mr H. and Kinnear, taking place subsequently to vaccination, are calculated, from their startling nature, to produce a very deep and hurtful impression. They are treasured up and remembered by ignorant or prejudiced people long after every circumstance of an encouraging nature has been forgotten. It is important, therefore, to have our ideas so arranged upon the subject, as to be capable of replying to this species of argument, in a proper and satisfactory manner.

An idea has been lately entertained, that cow-pox gradually loses its antivariolous influence over the system, after a certain period has elapsed from the date of vaccination. This question has not been sufficiently investigated, from the difficulties which must necessarily attend the inquiry; although a few well substantiated facts seem to give some countenance to the opinion.*

It is not necessary, however, to account in this way for those secondary cases of small-pox which we are now considering, because there is satisfactory evidence in the foregoing report, that cow-pox may exercise a very marked and salutary influence over the system at a period so remote as fifteen or sixteen years from the date of vaccination. This renders it impossible for us to assign any definite limits to the term of cow-pox efficiency, or to infer from one or two unfortunate cases like that of Mr H., that an individual betwixt the years of twenty and thirty is more likely to fall a victim to small-pox than one who is ten years younger. Although not disposed, therefore, to attach much importance to this opinion, I am very far from saying anything against the precautionary measure of a second vaccination, but would strongly recommend it in every case where any doubt is entertained as to the character of the former inoculation.

It is not uncommon, when a case of small-pox occurs after vaccination, to call in question the genuineness of the original vesicle. This is regarded by some as likely to bring discredit on the cause, and as tending to throw a degree of uncertainty over every case of vaccination; but several considerations warrant the belief, that the power of cow-pox has never yet been completely or fairly tested, in consequence of the many unfavourable causes to the operation of which it is widely exposed. It may be advisable to enter for a little upon the subject, with the view of ascertaining, if possible, the more prolific sources of failure, and thereby obviating future disappointments.

1. In estimating the effects of vaccination, we are very apt to overlook a circumstance which has done more perhaps to diminish and impair its usefulness than any other that can be mentioned. By a very large proportion of parents, the important measure in question is totally neglected, so that an extensive field is kept open at all times throughout the country for the wide-spread ravages of small-pox. It is obvious, that, even

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* Some very interesting cases, which seem to throw light upon this question, have been published by Dr George Gregory in the London Medical Gazette of May 2, 1835. I may here allude to another opinion, brought forward in the same communication, which would appear, from a circular transmitted by the Medical Board of Calcutta in 1832 to Superintendants of vaccination, to be pretty generally entertained by the profession in India. It is conceived, that the increased number of varioloid cases occurring subsequently to vaccination may be explained upon the supposition, that vaccine lymph has gradually become deteriorated by transmission through a number of individuals. No direct or satisfactory evidence has as yet been adduced in support of this opinion; and it is certainly at variance with all our preconceptions in pathology. There are other powerful causes of vaccine inefficiency, as we shall find in the sequel, without having recourse to the foregoing explanation; but, independently of these, we are justified, I think, in partly referring the increased number of varioloid cases to the additions which are daily being made to the gross number of vaccinations.

supposing the progress of vaccination to have no other hinderance than this, we could hardly devise a more efficacious method of crippling its salutary power. Recent calculations have shown, that even under the present defective system, the average mortality by small-pox in London has been reduced three-fourths since the commencement of vaccination. How greatly might the average be still diminished, were the practice universally followed? This surely is a subject well deserving of legislative interference, when we bear in mind the high and patriotic ends to be achieved by it.

2. But in addition to this serious disadvantage, which would materially interfere with the results of vaccination under any circumstances, there are other obstructions to its progress of a still more formidable nature. It is too common, I am afraid, more especially in the humbler walks of life, for this important concern, requiring much accurate attention, and open to fallacy in many different ways, to be intrusted to the care of women and other incompetent individuals, and it can scarcely be doubted, therefore, that numerous imperfect vaccinations are every year disseminated throughout the country. The injury which this must inflict both directly and indirectly, upon the cause of cow-pox inoculation, is too obvious to require illustration. Upon the whole it would appear, that less importance is generally attached to the process of vaccination than it really deserves,—a fact strikingly exemplified in the comparative neglect which this subject usually experiences in the course of professional education; for it must be consistent with the observation of almost every one who considers the subject, that very few students have any opportunities of witnessing the progress of cow-pox, and that fewer still are disposed to embrace them. It is probable, therefore, that many spurious and imperfect inoculations are regarded as satisfactory by even authorized practitioners, fully educated and accomplished in every other branch of their profession. That this must materially impair the efficacy of cow-pox is abundantly obvious; but, were the subject brought prominently forward, and its importance impressed more deeply than it has yet been, upon the minds of students, we have every reason to anticipate that future disappointments from vaccination would become daily less numerous.

It would be foreign to the object of this paper to particularize the many sources of fallacy which attend the process of inoculation. I merely allude to them at present, with the view of calling attention to the difficulties still inseparable from the farther dissemination of genuine cow-pox, and to the cheering prospect which there is, that greater care and accuracy in time to come will add much to its future efficiency and protecting power. In the meantime, great additional security may be obtained, either by employing at first the valuable test first recommended by Mr Bryce, or by having recourse at some future period, to a second vaccination.*

8. The foregoing sources of cow-pox inefficiency, are sufficiently general, I think, to encourage the belief, that were they once in a great measure removed, either by legal enactment, or by the moral power of conviction on the minds of men, still nobler and more brilliant triumphs than any which have gone before are yet in reserve for the cause of vaccination. But there still remains another unfavourable circumstance, which cannot be omitted with propriety in the present argument. It is not directly injurious like the others, but has an obvious tendency to retard the progress of cow-pox, by diminishing, if not its real efficiency, the hold which it possesses in public estimation. The circumstance to which I allude is this, that most probably our expectations have been too sanguine and unlimited with regard to the universal power of vaccination in protecting every system which it has fairly entered, from the influence of variolous contagion. We have no reason to suppose, that this specific power will be exerted in every individual case where cow-pox has been employed. There is an endless variety of constitutional idiosyncrasies, and it is not uncommon to meet with individuals who appear to possess an entire immunity from certain diseases. With such persons, the local effects of vaccination may be to all appearance regular and satisfactory, while the system may still remain susceptible of small-pox whenever the contagion assails it. Reasoning analogically, there is nothing fanciful in this supposition, because it is a well established fact, that even small-pox itself is occasionally no protection from a subsequent attack of the same disease. But as such cases are rare, their occurrence was not employed in former days, as an argument against the practice of small-pox inoculation. In the same way, cases of genuine small-pox occurring subsequently to cow-pox are also comparatively rare, and cannot be adduced, therefore, with any justice whatever, against the practice of vaccination.

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* Upon carefully re-inspecting all the cicatrices, and comparing the appearances presented by them with the preceding detail of cases, it would appear that no conjectures can be safely formed by examinations of this nature, as to the necessity or non-necessity of a second vaccination. A large proportion of the boys attacked by the late epidemic had large distinct cicatrices, while in more than half of those who escaped entirely, they were small and faint. It appears to me that much importance cannot be attached under any circumstances to the appearances of a cicatrix, when we consider how greatly these may be modified by various incidental occurrences; and without subscribing to the idea already noticed, that cow-pox gradually loses its antivariolous influence over the system during the progress of years. I would again urge the propriety of repeating the vaccination in all cases where any doubts exist as to the character of the original vesicles.

ART. III.—*Dissection of a blighted Ovum, with remarks.* By WILLIAM MACKENZIE, M. D. Lecturer on the Anatomy and Diseases of the Eye in the University of Glasgow.

CASE.—Mrs ———, whom I had attended at several of her confinements, sent for me on the 29th December 1834. Having had considerable bleeding from the uterus during the previous night, she complained of pain in the lower part of the back and abdomen, coming on in fits, and had experienced a sensation as of something giving way, followed (as she thought) by a discharge of water. She supposed herself six weeks or more gone with child.

On examination I found the vagina filled with clots of blood, and on passing the end of the finger into the *os uteri*, ascertained that it was occupied by a solid substance.

The bloody discharge continued during the day, but diminished in quantity, and the fits of pain also became less frequent and less severe. During the 30th, the patient kept her bed, and had little or no pain or discharge. On the morning of the 31st, the contents of the uterus came away, and the pain and hemorrhagy immediately ceased. The patient speedily recovered, without the occurrence of any remarkable symptom.

Dissection of the Deciduæ and Ovum.—The mass discharged was of an elongated and flattened pear-shape, the part of it which had occupied the *cervix uteri* being about the thickness of the ring-finger, and nearly two inches long. One edge of what I may call the body of the mass presented a projection, covered with laminated clots of blood, and apparently consisting of such. On carefully tearing open, however, this part, while the whole mass lay immersed in water, a vesicular protrusion came into view, formed by a delicate transparent membrane, the farther examination of which I deferred till I should have ascertained the general structure of the mass.

The outer surface of the whole was shaggy, and on one of its flattened sides presented a deep depression or cleft, filled with blood. The outer shaggy membrane was plainly the *decidua vera.* The cleft just mentioned penetrated completely through the thickness of this membrane, and communicated with the cavity, which, at such a period of gestation, is filled, when in the natural state, with the fluid, to which some have given the name of *hydroperion* *. On laying open this cavity, however, it was found filled with clotted blood, on removing which its smooth serous-like surface was distinctly recognized. I tried with the point of a needle whether I could raise up a pellicle, like a serous membrane, from this smooth surface, which is supposed to secrete the hydroperion; but I found it impossible to do so, nor do I believe any such membrane to line the cavity in question.

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* From *ὕδωρ water*, *περὶ about*, and *ὠὸν egg*.

The cavity, again, which is formed by the *decidua reflexa*, for containing the ovum, was also filled with coagulated blood.

The ovum, in fact, had escaped from this cavity, in which it is naturally lodged, and one extremity of it formed the projection which I have already described as surrounded by laminated coagula. On removing these, and carefully following the immediate membranes of the ovum, they were found to extend downwards to that part of the mass which had occupied the neck of the uterus. This pedicle, as it were, was formed by a prolongation of the *decidua vera*, secreted apparently by the *cervix uteri*, and containing within its substance a portion of the ovum. Instead, therefore, of presenting the usual rounded or oval form, this ovum was narrow and elongated, being fully three inches long, and about half an inch broad; and instead of being contained in its natural nest, the cavity of the *decidua reflexa*, it lay within the substance of the *decidua vera*.

The membranes of the ovum consisted of the chorion and amnion. The lower part of the ovum being still left enveloped in the substance of the *decidua vera*, the *villi* of the chorion were observed penetrating into that substance. The greater part of the chorion was smooth, thin, and transparent; but at the lower part of the ovum it was stronger than where it was surrounded by the clotted blood, and presented somewhat of its natural villous appearance. Near the extremity of that part of the mass which had been contained within the *cervix uteri*, the chorion formed an evident *cul-de-sac*.

The amnion, an extremely delicate membrane, was in contact with the inner surface of the chorion, and was at some places adherent to it.

Within the amnion, and at that part of the ovum surrounded by the mass of coagulated blood, there appeared a small body of an elongated form and reddish colour, which seemed to be the embryon in a state of atrophy.

Opposite this part, and in the space between the chorion and amnion, was the umbilical vesicle, about one-eighth of an inch in diameter, filled with an opaque yellowish-white substance. Attached to the vesicle were seen floating loose the remains of its duct, very slender, and about one-fourth of an inch long.

Remarks.—This blighted production appears to be remarkable on three accounts; viz. 1*st*, The unnatural situation of the ovum in respect to the deciduous membranes; 2*d*, The state of the chorion, it being almost entirely deprived, at so early a period of gestation, of the *villi*, with which it ought to be thickly covered; and 3*d*, The atrophic condition of the embryon, and its separation from the umbilical vesicle, which also appears in a morbid state.

I. In the first place, the question naturally occurs to us, had the ovum in this case ever occupied its natural place within the cavity of the *decidua reflexa;* or, on escaping from the Fallopian tube, had it proceeded at once along the side of the uterus between the lining membrane of this cavity and the external surface of the *decidua vera*, or actually enveloped in the substance of this membrane, and thus assumed from the first the elongated form, and the unnatural position, evident in the preparation now before me?

To this question I am disposed to reply, that I think it more likely that the ovum had on first entering the uterus assumed its natural situation, within the substance of the *decidua vera*, and had not slipped along between this and the lining membrane of the uterus, as I cannot conceive how the *decidua reflexa* could otherwise have been formed, which it had distinctly been in this case. I think it scarcely admits of doubt that the ovum had escaped from its natural cavity, (the cavity of the *decidua reflexa*,) in consequence, perhaps, of irregular contractions of the muscular fibres of the uterus, excited in all probability by the altered condition of the embryon and umbilical vesicle.

The notion commonly entertained regarding the mode in which the ovum conducts itself on passing into the uterus, and the formation of the deciduous membranes, is, that when the ovum sent along the Fallopian tube, reaches the uterus, it is stopped by the decidua stretched across the aperture of that tube, and that by the growth of the ovum this membranous production is gradually made to encroach upon the cavity of the uterus, and thus form the *decidua reflexa.*

A more correct view of the matter appears to be, that in the two points corresponding to the superior angles of the cavity of the uterus, the *decidua* is prolonged for some lines, or even for the length of half an inch, into the Fallopian tubes. At the period of the passage of the ovum into the uterus, the decidua, occupying the Fallopian tubes and lining the uterus, has probably attained no great degree of density, and will offer consequently but little resistance to the advancing ovum. This probably penetrates, then, into the Fallopian portion of the decidua, and arrives within the uterus, completely enveloped in that substance. As the ovum advances in size, the *decidua* is not pushed mechanically before it, but grows with it, surrounding it on all sides. In the progress of developement, however, a portion of the *decidua*, corresponding to the forming placenta, is either absorbed or pushed aside, permitting the umbilical chord and the greater part of the foetal surface of the placenta to be free from any covering of *decidua*, while a thin lamina of this membrane continues to invest the uterine surface of the placenta, even to the end of pregnancy.

I agree, then, to a certain extent, with the opinion of Breschet,[*] that the decidua completely surrounds the ovum, and that it is an erroneous notion which is generally entertained, that the portion of the circumference of the ovum which is to correspond to the placenta, and where the placenta is to be attached to the uterus, is destitute of decidua at any period of gestation. With Breschet, I reject the doctrine of Bojanus,[†] who, considering the layer of decidua which in every after-birth we discover investing the uterine surface of the placenta, to be produced at a later period than that at which the primitive decidua, or *decidua vera*, is formed, has bestowed on it the name of *membrana decidua serotina.*

Breschet, however, maintains that two laminæ, namely, the *decidua vera* and the *decidua reflexa*, are found intervening between the uterus and the placenta; a notion which I regard as unfounded. Breschet seems misinformed, in fact, regarding the point of reflexion of the one decidua into the other. If we examine the after-birth, in any ordinary case of parturition, we find only one lamina covering the uterine surface of the placenta, and dipping between its lobules. We find the two *deciduæ*, adhering closely to each other, and so easily torn, that we can trace them in general but a very little way along the fœtal surface of the placenta. In a case of premature delivery, however, preceded by frequent hemorrhagy, I found the two *deciduæ* adhering together in such a way, that I was able to separate them like two sheets of wet blotting-paper, and I easily traced them for about an inch and a-half along the fœtal surface of the placenta. At that distance from the edge of the placenta, the *decidua vera* was plainly seen reflected into the *decidua reflexa*, while the lamina covering the uterine surface of the placenta, the *serotina* of Bojanus, appeared continued into the external surface of the *decidua vera* at the very edge of the placenta.

II. The second remarkable circumstance about this ovum is the state of the chorion.

From the earliest period at which the human ovum has been observed after its passage into the uterus, its exterior surface, which is formed by the chorion, is found to be invested with a thick *tomentum*, to which is commonly applied such an epithet as *lanuginous* or *villous.* At an early period, the *villi* of this *tomentum* are spread pretty equally over the whole external surface of the chorion; by-and-bye, they are seen to be most abundant towards the placenta, while the portion of chorion most remote from the placenta presents comparatively few villi;

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[*] Mémoires de l'Académie Royale de Médecine, Tome ii. p. 100. Paris, 1833.
[†] Isis von Oken für 1821.

at birth, if we tear the *deciduæ* from the external surface of the chorion, we observe that it has become almost smooth, presenting only some slight remains of the *tomentum*.

In the ovum before me, the chorion, even at so early a period of gestation, has lost almost entirely its villous character, a few insulated *villi* only being discoverable towards the lower part of the ovum, while the upper part, in the neighbourhood of the embryon and umbilical vesicle, appears perfectly smooth. Nothing like a placenta is visible, and if the opinion of some physiologists[*] be just, that the placenta is formed in a great measure by the *villi* of the chorion, none could have been produced in this case.

This naturally leads me to notice the opinions which have been advanced regarding the nature of the villi of the chorion.

One of the functions which they perform is evident enough; namely, the mechanical support which they afford to the ovum by their insertion into the surrounding decidua; but they probably execute, in addition to this, much more important offices.

The common notion is, that they are vessels. Dr Hunter speaks[†] of them as "the shaggy floating vessels," and in another part[‡] as "transparent ramifying vessels," adding that they "a good deal resemble lymphatics."—"When the ovum first descends," says Dr Burns, "the chorion is everywhere covered with vessels, which sprout out from it."[§] From the vague language generally employed on this subject, it is impossible to know whether by vessels are meant arteries, or veins, or both of these, or lymphatics. The modern French authors on midwifery generally describe the villi of the chorion as lymphatic vessels.[||]

The earliest microscopical figure of the villi is that by Lobstein. He considers them to be tubular, and therefore vascular;[¶] and is of opinion that, by fixing themselves in the decidua, they form along with it the placenta.

Carus, in a work which I have not had an opportunity of consulting, maintains that these filaments cannot be blood-vessels; because, says he, blood-vessels never end in free extremities, but always in loops or arches. He considers these villi as serving, however, for absorption, and compares them with the free bulbous extremities of the villi of the intestines. He denies that their concurrence serves to form the placenta.

Breschet and Raspail[**] have followed, and confirmed, the opinion of Carus, that the *villi* of the chorion are not vascular, but upon more satisfactory grounds than those of that author; for, in fact, the argument that blood-vessels cannot end in free extremities, by no means settles the question regarding the vascularity of filaments having such extremities. Filaments of this description may contain in their substance vascular anastomoses; and this is actually the case with the *villi* of the intestines.

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[*] Lobstein sur la Nutrition du Foetus, § 19.—Meckel, Manuel d'Anatomie, Tome iii. p. 752.

[†] Anatomia Uteri Humani, Tab. xxxiv.

[‡] Anatomical Description of the Human Gravid Uterus, p. 53.

[§] Principles of Midwifery, third edition, p. 146.

[||] Baudelocque, Maygrier, &c.

[¶] Sur la Nutrition du Foetus, p. 67.

[**] Répertoire Générale d'Anatomie et de Physiologie Pathologiques, Tome v. p. 380. Paris, 1828.

Breschet and Raspail state, that the points of insertion of the *villi* of the chorion are quite filiform,—a fact certainly unfavourable to their asserted vascular structure, and perhaps even to the idea that, although not actually vessels themselves, they may be supplied with vessels ramifying through their substance; for if there are vessels in any organ, it is to be presumed that they will be of greater caliber near to their origin, and decrease as they proceed towards the extremity of the organ in which they run. Now, not only is the insertion of each of the *villi* into the chorion greatly contracted, but the subdivisions of the *villi* are everywhere connected together in the same way; that is, by filiform attachments, so that the root of each branch is in general at least forty times more slender than its summit.

The same observers describe the summits of the branches as bulbous and rounded, the bulbs being covered by a kind of *epidermis*, which can be removed, leaving the substance of the ramifications entire. The epidermis separates in circular portions. Both it and the proper substance of the *villi* present the appearance of globules under the microscope; but neither of them seems fibrous.

It is the decided opinion of Breschet and Raspail, that the villi of the chorion present no trace of vessels or vascular network, neither on being viewed entire or cut across. They contrast them with the villi of the intestines, and point out the striking difference, founded on the vascularity of the latter, compared with the non-vascularity of the former.

The questions of the use of the *villi*, whether they form the placenta by adhering to the *decidua*, and whether, primitively organs of absorption, they end by becoming vascular, they leave undecided.

If we take one of the lobules of the placenta, and unravel it by maceration, we reduce it to a mass of *villi* exactly similar in appearance to those of the chorion; their branches, like those of the latter, being connected by filiform roots. If the placenta, however, has been injected, these *villi* partake of the colour of the injection; and on submitting one of them to the microscope, it is evident that it is supplied with blood-vessels. I am inclined to think that an artery and a vein probably run side by side in each villous ramification; that the *villi* of the placenta form in fact a frame-work, to which are sent the vessels of the umbilical cord, which otherwise could not be properly and regularly distributed. I am disposed to adopt the doctrine of those who consider the placenta as formed out of the *villi* of the chorion, which undoubtedly accumulate at an early period of gestation towards the placental extremity of the ovum, leaving the rest of the chorion comparatively bald. Not vascular in themselves, these *villi* receive the ramifications derived from the umbilical vessels, and serve to insure to them a distribution, the minuteness and regularity of which are probably essential to the proper exercise of their functions.

If these conjectures be true, it will follow, that should it happen from any cause that the *villi* of the chorion are imperfectly developed, as seems to have been the case in the ovum before me, the placenta cannot be formed, and of course an early abortion must be the result.

III.—The third remarkable circumstance about this ovum is the atrophic state of the embryon, and its separation from the umbilical vesicle, which also appears to be in a morbid condition.

It is well known to practitioners in midwifery, that a diseased state of the umbilical vesicle and of the embryon is very frequent in cases of abortion. There is good reason to believe that the imperfection of the embryon in many such cases is the consequence of the altered condition of the vesicle; for upon the offices of this part, whatever these may be, the growth of the embryon appears entirely to depend in the early weeks of gestation.

The umbilical vesicle in some abortions is met with in what may be regarded as nearly a natural state; but much more frequently it either fails to be detected, or it is found diseased; often shrunk, sometimes dropsically enlarged. Velpeau tells[*] us, that in about two hundred cases, examined before the end of the third month, he found it only thirty times in what he considered a healthy condition.

To be able to judge whether the umbilical vesicle is healthy, it is necessary not merely to have studied the anatomy of this part as given by good authorities, but to have examined numerous specimens. The difficulties attending this study have led some writers to form a very imperfect notion of the vesicle, while others have even denied its existence.

About the fifteenth or twentieth day after conception, the umbilical vesicle is of the size of a pea, that is, it measures from two to three lines in diameter. It probably acquires its greatest size in the course of the third or fourth week, and is at this period larger than the embryon. Before the end of the second week it is smaller than what has been above-mentioned, while after the fourth week it is evidently reduced in size, and continues to decrease; when reduced to the size of a coriander seed, which it is in the sixth or seventh week, it ceases to shrink, at least with proportional rapidity. It now becomes flat or lenticular in form, and insensibly diminishes. I believe it never entirely disappears, though, from its small size and intimate connections with the membranes between which it is placed, it is often in vain that we search for its remains in the third month; while, on the other hand, it is sometimes found in abortions of the fourth, fifth, or sixth month, or even at the full time.

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[*] Traité complet de l' Art des Accouchemens, Tome i. p. 272. Paris, 1835.

Diemerbroeck,* the discoverer of the umbilical vesicle, described it as situated within the cavity of the amnion,—a mistake easily accounted for. Albinus described it as *sub amnio*,—an ambiguous phrase, and represented it as seen after the amnion was removed.† Wrisberg was the first who distinctly described and represented its true situation, between the chorion and amnion.‡

For the first thirty or forty days it is enveloped in what is called *corpus vitriforme* or *reticulatum*,—a fluid bearing some resemblance in transparency and consistence to the vitreous humour of the eye, and which is infiltrated into a cellular tissue, connecting the chorion and amnion. At a somewhat later period, the vesicle attaches itself to the external surface of the amnion, or to the internal surface of the chorion, and has then the appearance as if contained within the substance of one or other of these membranes.

The umbilical vesicle is connected with the embryon by a hollow pedicle, which undergoes certain changes as pregnancy advances. To the end of the first month, it measures not less than two and not more than six lines in length; it is about a quarter of a line in thickness; and expands, where it joins the vesicle, somewhat into a funnel-form. It is hollow, and communicates with the cavity of the ileum, so long as the vesicle exercises its function.

The vesicle and its canal are supplied with blood-vessels, which take their origin from the inferior mesenteric artery of the embryon and the corresponding vein, and are called the omphalomeseraic vessels.

After the first month, the pedicle becomes impervious, elongated, and at last very slender, while the remains of the vesicle are gradually carried on by the growth of the umbilical cord, till they lie near to the placenta. By this time the pedicle is broken across, and no longer recognizable.

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* Opera, p. 304. Ultrajecti, 1672.

† Academicæ Annotationes, Lib. i. p. 74.

‡ Descriptio Anatomica Embryonis. Gœttingae, 1764.

The *parietes* of the umbilical vesicle are pretty thick, and are torn with difficulty. They appear smooth and regular when the vesicle is full, but become wrinkled when it is empty, or as its contents are removed.

Various analogical reasons have led to a comparison of the umbilical vesicle to the yolk-bag of the bird's egg, or rather to the blastodermic vesicle contained within the yolk-bag; and of the substance contained in the vesicle to the yolk itself. The fluid in the vesicle is said to be oily or chylous, and of a pale yellow colour. The pedicle communicating with the bowel of the embryon forms a striking point of analogy, and the omphalomeseraic vessels another.

It cannot be doubted that the vesicle is subservient to the nutrition of the embryon during the early period of its growth; that is, till the umbilical cord and vessels are formed. Previously to the connection being accomplished between the ovum and the uterus, the nutrition of the embryon of the MAMMALIA is similar to that of BIRDS; after the placenta is in operation, the umbilical vesicle is no longer of use.

In the ovum before me the vesicle is already reduced to the lenticular form; its contents are solid and opaque, and the pedicle torn across; changes which, had they been the only deviations from the healthy state, we should not have hesitated to consider as the primary cause of abortion. It happens, however, that the embryon, instead of the distinct form and considerable developement of a six weeks' fœtus, is reduced to a small curved body of a reddish colour, in which no distinct lineament of an embryon can be recognized, while the chorion is almost smooth, no placenta present, and the whole ovum out of its natural place.

I shall not occupy the time of the reader farther than simply to mention the interest which attaches itself to the preparation before me, not merely in an obstetrical, but in a medico-judicial point of view.

In cases of abortion produced by violence, the medical jurist may have submitted to his examination the aborted ovum, and ought to be prepared by careful dissections of *ova* expelled in consequence of other causes, to be able to discriminate between the one set and the other.

In the specimen before me, the decidua was found rent, and both its cavities filled with blood,—circumstances which might naturally give rise to suspicion; but the misplaced situation of the ovum, the chorion deprived of its tomentum, the atrophic state of the embryon, with the torn pedicle hanging from an opaque umbilical vesicle, are changes which could take place only in the course of time, and are results evidently not of violence, but of impeded and disordered developement.

68, *George Square, Glasgow, July* 15, 1835.

Art. IV.—*A Case of Aneurism of the right Subclavian Artery cured by operation.* By Samuel Hobart, M. D., Member of the Royal College of Surgeons London, and Surgeon to the Cork House of Industry, and Lunatic Asylum.

On the 23d of April, Mr John Wright, a respectable inhabitant of this town, aged 38 years, and of good bodily habit, consulted me for a tumour situate immediately under the right clavicle, near its acromial end, and extending towards the *axilla*, from which he suffered, in the different movements of the extremity, considerable inconvenience, compelling him to use the left when any exertion was required. He complained of acute pain under the corresponding *scapula*; but with these exceptions seemed in good health.

On examination, I perceived a pulsating tumour somewhat larger than an ordinary hen's egg, occupying the space mentioned, and of so unequivocal a character as enabled me to decide immediately on its nature. Upon inquiring, however, into the history of the case, he gave me to understand that about four months previous, while in the enjoyment of his usual health, and uninfluenced by any bodily exertion, he (to use his own words) "suddenly felt an unusual sensation as if his heart had leaped from its proper position to that now occupied by the tumour." This, however, went off in a little time, and he paid no attention to it afterwards until the appearance of the tumour, and its increasing inconvenience had somewhat alarmed him. In this state he continued his ordinary avocations, and having been the day before in a neighbouring town (Bandon,) he consulted Mr Toole, a respectable and talented practitioner, whose opinion I now learned was in perfect accordance with mine.

Unwilling to create sudden alarm, and anxious to watch the progress of the case for a few days, after hinting at the probable resource to which we might finally be driven, I directed some aperient medicine, and the topical application of a cold lotion. This plan was followed for two or three days, during which time no improvement was manifested. I now expressed my conviction of the necessity for operation, and the consequences attendant on refusing to submit to it, expressing at the same time my readiness to avail myself of the benefits accruing from a consultation. To the latter proposition he immediately acceded; and

Dr Bullen, a practitioner of long standing, and justly holding pre-eminence in his profession, was called in, and after minutely weighing the circumstances of the case, fully concurred with me in its nature and remedy. But as we wished to view its progress a few days longer, and prepare the patient for operation, he was freely purged, largely bled, and had the cold applications continued. Notwithstanding this treatment, the tumour was perceptibly increased, and on the 5th of May had acquired the size of a large duck-egg. Arrangements were then made for inclosing the artery in a ligature on the 7th.

The patient having been placed on his back on a table, with the shoulders a little raised, the head and neck inclined to the left side, and the right shoulder and arm drawn downwards, the operation was performed by me, (at a few minutes past twelve o'clock,) with the able assistance of Dr Bullen, and in the presence of Mr Toole of Bandon, Mr Ludgate, and several other medical friends, in the following manner. Dr Bullen having carefully drawn down the integuments over the clavicle, I divided them on the bone, by an incision about two inches in length, commenced at the outer edge of the sterno-cleido mastoid muscle, and extending towards the acromion. The integuments were then allowed to retract, and I next cut through the *platysma myoides* and cervical *fascia*, completing their division on a director. The external jugular vein was drawn to the outer extremity of the wound, and retained there by means of a blunt hook. The cellular membrane and adipose substance, which were considerable, I carefully detached with my fingers and the handle of a scalpel, until I arrived at the artery, where it emerges from the anterior *scalenus* muscle. I then carefully made an opening into its sheath, barely sufficient to allow the introduction of an ordinary probe, and avoiding all other disturbance of its contiguous connections, cautiously passed a common aneurismal needle armed with a single silk ligature round the vessel, and tied it. The tumour now became somewhat flattened, all pulsation stopped, and the radial artery ceased to beat. The lips of the wound were then brought together, and kept in apposition by means of a single suture and adhesive straps. The limb was enveloped in a flannel bandage, and the patient was put to bed. The progress of the operation was not retarded by a single incident, and the demeanour of the patient throughout was most satisfactory, having borne it with the greatest calmness, and never uttered a moan.

9 o'clock P. M. He is quite tranquil, the tumour little altered since the operation, the temperature of the limb not perceptibly lessened, and otherwise no variation.

8. 11 o'clock A. M. Slept uneasily; pulse at the left wrist

above 100, full and strong; heat in either axilla 98; no constitutional disturbance, took some toast and tea. In the evening I found him nothing altered.

9. 11 o'clock, A. M. Had a good night; slept well; pulse 100; heat of limb 98; no evacuation from the bowels; otherwise as at last report. He was directed to take every third hour two wine-glassfuls of a solution of one ounce of Epsom salts in eight ounces of infusion of senna.

10th. Slept well last night; bowels moved three times; pulse 96; temperature in axilla 98. The dressings were now removed, and the wound appeared healed, except where the ligature occupied; appetite, general health, and spirits good. On removing the roller, and applying the thermometer at the bend of the elbow, or placing it in the hand, no difference could be observed in the limb operated on from similar positions of the sound extremity. Bandage and dressings reapplied.

11th. Had a good night; bowels moved once; pulse 90; temperature as yesterday.

12th. Slept well; two alvine evacutions; pulse 84; heat 96.

13th. Good night; bowels acted on twice; pulse 96; temperature 96. The dressings removed save a small strap to retain the ligature; roller taken off and not reapplied.

14th. Slept well last night; one dejection; pulse 90; heat of limb as before.

15th. Pulse 80; otherwise as yesterday.

16th. No alteration.

17th. Pulse 88; temperature not altered.

18th. Pulse 90; bowels affected; an indistinct pulsation felt in the right radial artery.

20th. Going on well; pulsation rather more perceptible at the wrist. He was now allowed to sit up in his apartment.

22d. Bowels confined; pulse 94. The saline infusion of senna was repeated.

23d. Two evacuations; pulse 84. Ordered a little fowl broth. From which day until the 29th there was no alteration in the symptoms, but the ligature being thrown off, he was allowed to take a little animal food. For two days he continued to move about the house, and on the 2d of June walked out.

July 30th. Mr W. has been since employed as usual in business. All the movements of the limb are performed without the slightest inconvenience. He enjoys his accustomed health. The tumour gradually declined, and at present there is scarcely a trace of it remaining.

Cork, 1*st August* 1835.

ART. V.—*On Dysentery, as it epidemically prevailed at Bolton in the Autumn of* 1831. By JAMES BLACK, M.D. of the Royal College of Physicians, London.

DURING the latter part of the summer and autumn of the year 1831, the affections of the intestines exhibited a very remarkable transition, not only from mildness to a greater or less degree of severity, but also from one morbid province to that of another, according as the several tissues and organic emunctories of the intestinal tube were more or less, or in succession, affected. Different as are the symptoms of cholera, diarrhœa, and dysentery, and distinct as we know their pathology to be, they yet, in many instances, betray such a sympathetic and consecutive connection, that it requires very accurate observation to detect their several lines of demarcation, or to aver, in many instances, that we have to do with any one of them, independent of its epidemic congeneric disorders.

This fusion of disease was very observable among the intestinal affections prevalent at Bolton at the time mentioned. During the latter days of July and beginning of August, while the temperature was observed never below 62° in the night, and ranged between 76° to 80° in the shade at noon, with little wind and a moist atmosphere, cholera, such as I had particularly observed, for a few preceding autumns, began to make its appearance. The well-marked cases of this disease were much more allied to the malignant species, which first made its appearance at Sunderland in October of this same year, than to the bilious, or, what has been called, the common English cholera. The first case I witnessed of this severe endemic was on the 4th of August. It commenced suddenly in the night with vomiting, and with watery, ochrey, and gruelly dejections, accompanied with severe spasms of both the upper and lower extremities, and with long persistent coldness and clamminess of the skin; pulse almost gone, and voice weak. This case was carried through the atonic stage, but death took place four days sfterwards, from the low consecutive fever.

Several cases of similar character, but of less intensity or of more fortunate issue, soon followed; but all exhibited cramps, twitchings about the umbilical region, and the diagnostic watery or gruelly evacuations. In a short time after the appearance of cholera, 'dysentery showed itself, either as an initial disease, or as closely following a previous attack of cholera.

History and Symptoms.—In many cases, from the very first, the disease was ushered in with bloody stools, intermixed with small *coagula*, much mucous and gelatinous excretions. It was accompanied with severe pain in the lower part of the abdomen and in the course of the colon, and great tenesmus, the pulse often quick and full, great thirst, hot skin, and in the more entonic cases the seizure was sudden, and in the evening or during the night. In the more severe cases, the purging and tenesmus were very obstinate, the stools being very copious, and consisting of lymphous shreds and glairy mucus, tinged or streaked with fluid blood and coagula, next merging into ochrey, pultaceous, or reddened gelatinous matters, having an occasional lump of green feculent bile. A dark, bilious, or ashy feculent stool or two would alternate with a scanty one of slimy ochreous matter, the former passed without, the latter kind always with more or less pain. The pulse was in all cases quickened, rarely hard, mostly soft and full. The skin was soft and perspirable, and easily brought to sweating, though often without any corresponding relief to the purging and tenesmus. The urine was scanty or suppressed; the tongue white, or covered with a creamy fur; and the patient felt much desire for cold liquids. In all the acute stages there was little or no appearance of bile in the dejections. In a few cases, vomiting of muculent or saburral matters with *nausea* took place.

Those affected with cholera, as the month of August advanced, ran every risk of declining into dysentery, if great care were not taken to rectify and invigorate the biliary secretion; and especially in those cases of the former disease in which the heat of the skin kept up, and some wandering and griping pains were felt in the lower belly. When this morbid transition from the stomach and *primæ viæ* took place to the lower section of the canal, the worst features of dysentery appeared; and, in addition to much *tormina* and *tenesmus*, slight oozings of mucus flowed from the anus. Debility soon became great, and was very much felt, almost to *syncope*, immediately after a stool. In these secondary cases, and even in some of the originally acute ones, not much pain was experienced on pressure, the abdomen from the *umbilicus* downwards presenting more of firm fulness than of tension or hardness. The erect and even the semierect posture often produced an attack of fresh tenesmus, or even a total relapse.

As the month still further advanced, cases of cholera decreased, and became less severe, while those of diarrhœa and dysentery increased in severity as well as in number. It was computed by the medical gentlemen of the town, that about one-third of the inhabitants of the place were, in the course of three weeks, more or less affected with bowel complaints, from the slight shades of diarrhœa requiring no medical aid, to the severer forms of dysentery, of which several died. Dysentery outlived the cholera, and in the latter half of the epidemic commenced more as an original disease, with few or no premonitory symptoms, and very often attributable to no exciting causes or errors in diet.

In the latter or severer stages of some cases, the tenesmus was incessant and excruciating, and easily excited by the smallest *ingesta* from a sympathetic vermicularity between the *œsophagus* and *rectum*. *Aphthæ* sometimes affected the mouth and *fauces*, while the tongue would become moist and slimy. Great emaciation and sinking of the orbits often took place. The immense quantity of the matters voided in some cases was remarkable; when the small quantity of food and drink previously taken was considered. These preternatural discharges, and especially those of a grumous or ochrey nature, were very debilitating, and evidently proceeded from some immediate and morbid elaboration of the blood. Relaxation of the *sphincter ani* sometimes took place in children and old people, which a constant oozing of sanguineous washings often attended, without any feculent discharge. I observed in the dysenteric motions, little or none of what are termed *scybala*, except in one case of a pregnant patient, who had laboured under the disease for three weeks, with copious and painful discharges, which at length brought on parturition, after which she passed a prodigious quantity of nodulated stools, and eventually recovered. A relapse was easily induced by sitting up too soon, which often instantly recalled the tenesmus. Drinking too freely of tepid liquids at once, and above all cold ones in any quantity, was injurious; but where due care and treatment were employed, the disease, even in the acutest form, generally terminated favourably in from eight to twelve days. In a few cases which had been severe, I heard from the patients, that they had been for some weeks and even months after the attack, more or less troubled with an irritation about the anus, accompanied with an involuntary oozing of slimy mucus.

Infants and children were often seized suddenly with bloody stools, followed by *tormina*, straining, and discharges of gelatinous flakes, having a gangrenous odour. The debility in some cases became great, and threatened soon to carry off the little sufferers in a species of atony or collapse. If they did not fall a sacrifice to the disease in two or three days, they recovered in the most of cases very speedily,—the mucous coats of their bowels soon recovering their integrity. As the disease declined in frequency, it became less acute, and required not so powerful antiphlogistic measures to control it; while the latter cases merged into the diarrhœal character, and were cured by the simpler remedies applicable to that disease. With this decline in strength and frequency, a fever of a typhoid type supervened about the beginning of October, and continued to prevail among the working and lower classes through the first two months of winter, without its being attended with any affections of the bowels more than is usual in ordinary cases of *typhus.*

Death in some old people seemed to have proceeded from a diffluent gangrene having invaded the lower bowels; and the fatal cases in children terminated in a collapse of all the powers of life, similar to what takes place in the last stages of malignant cholera at their age.

Pathology.—The theory of Sydenham's peccant humour, and that of Cullen's preternatural constriction of the colon, with even the more modern and plausible one of the morbid state of the liver being always the proximate cause of dysentery, having been long, and more lately disposed of in the opinions of modern observers, the symptoms of the disease have, in more consistence with morbid anatomy, been attributed to irritation, *phlogosis*, and inflammation affecting one or more of the coats of the lower section of the intestinal canal. The gradual, and, in some cases, the quick transition of diarrhœa and spasmodic cholera with gruelly evacuations, into attacks of acute dysentery, naturally drew the attention to some morbid catenation between these diseases; at least a metastasis of no very violent nature was evident. The two mentioned antecedent diseases are, however, allowed more particularly to reside, if not altogether so, in the small intestines; while dysentery is as generally granted to have its distinct location in the larger bowels. The nature, however, of the morbid lesion in either genus is the great desideratum. In diarrhœa, irritation, with more or less of capillary phlogosis of the mucous coat of the small intestines, has been found the most general morbid lesion; but dissection has not very definitely fixed the seat of cholera, or even the source of the immense discharges in this disease, though there is no doubt, that the mucous surfaces of the small bowels afford by far the largest contribution, in preference to gastric, biliary, or pancreatic secretion. By what morbid link the excernent office was more or less suddenly transferred from pouring out the peculiarly inodorous or gruelly fluids of cholera from the mucous coats of the small intestines, to that of tormenting the same individual with frequent, bloody, and lymphous stools, denoting high inflammation of the lower part of the bowels, is not easy to explain. The presumption is, that there was some analogy, if not identity, of morbid action, however different it might be in degree. This order of the sequences was very frequently observed in the early period of the epidemic; but the retrograde order of the diseases never in any instance. Whenever the morbid action was transferred to the colon, and became there in any degree concentrated, it never reverted to the upper part of the tube, in the shape of any symptoms of cholera. Diarrhœa often merged into cholera of either a bilious or a spasmodic nature, and as frequently into dysentery; but this last disease never showed the least disposition either to revert to cholera, or to merge into it, where the latter form of disease had not previously appeared. In the order of the vermicular motion alone were these several *genera* of diseases, with their different shades, propagated, until even the last vestige of their connection remained in an anal irritation with an exudation of mucus.

Whatever opinion might be entertained about the liver being the primary seat of functional or secretory derangement in these diseases, and I am not much inclined to attribute a great deal to this part of their pathology, yet it is to be remarked, that, both in cholera and dysentery, a due excitement of the hepatic discharges was followed by a corresponding alleviation of the symptoms in either disease. According to the strict humoral pathology, this was effected by inducing a diversion of the peccant humours; but it is more consonant to modern theory to predicate, that, there being some morbid congestion, or passive *hyperæmia*, in the whole of the portal system, including the mesocolic and hæmorrhoidal veins, as constituting the initial lesion in both diseases, without any topical affection of the liver, the unlocking and exciting the secretion of the liver even to some profuseness, would relieve the contiguous vascular load, and direct a more active current of the blood through the affected intestinal tissues. The danger arising from a preternatural activity and tension of the capillary circulation, in any part of the body, is never to be compared with the serious and irretrievable consequences that will soon result from sanguineous *remora* or congestion among the lax and cellular textures of the thoracic and abdominal viscera.

Whatever may be the intimate nature of the organic pores of the mucous coat in cholera; whether it be an active or entonic exosmose, or a passive transudation of the serous parts of the blood, upon either of which states dissection has as yet thrown no certain light, in dysentery we have little hesitation in attributing the whole symptoms to inflammation of the mucous coat, and often of the muscular one, with irritation always of the latter envelope. No doubt, the inflammation in many cases is of a very congestive nature; the loaded vessels quickly giving way, and pouring out the superfluity of their contents, even at the very onset mixed with the gelatinous shreds thrown off by vessels yet in a state of integrity but highly inflamed;

and with mucus secreted by others yet only affected with subacute or irritative inflammation. The sensibility being correspondingly increased, the smallest portions even of these secretions, as well as of *fæces*, prove sources of further irritation, which excites the consentaneous action of the muscular coat, producing *tormina*, interrupted stricture, and bearing down with *tenesmus*.

The pain was often in no proportion to the presumed seriousness of the lesions going on within the bowels; and pressure often failed to increase the little that was complained of; the peritoneal coat not being affected, and the distensible nature of the other two coats allowing of considerable lesion without painful sensation, except when there were undue irritative spasm and contraction. Pain was, however, in some cases, sufficiently steady and severe; but not often increased on the first attempts at pressure, though much more so on the longer or deep impression of the hand.

Among the fatal cases, few opportunities could be procured for desirable inspection; but in those which I obtained, ample evidence was afforded to verify the disease as one of a seriously inflammatory nature, confined, however, to the *caput coli*, *colon*, and *rectum*, and they are the following.

Case 1st.—A. C. coach-maker, aged 45, stout made and generally temperate, had been twelve days ill. The first attack presented symptoms of cholera, with profuse clammy sweats and a small pulse, to which dysentery soon succeeded with the same state of the skin and pulse. The dejections for several days consisted of much blood, bloody water, mucus, and full of lymphous flakes, attended with great pain and *tenesmus*.

Necroscopic appearances.—All the abdominal viscera were natural outwardly; and no serosity or adhesions were observed. The distal circumference of the mesentery was reddened. The *omentum* near the colon was suffused; the colon was dark and mottled outside from the *caput* down to the *rectum*; its cavity was empty and the peritoneal coat sound. The mucous coat was completely disorganized, abraded, and ulcerated in many parts, with much gangrenous solution of the whole surface, which had also extensively affected the muscular coat. The bowel was easily torn through at the *rectum*, where the disorganization was most intense, and the colour of which faded away very gradually towards the *caput*, beyond the valve of which it did not extend. The longitudinal bands preserved their integrity the farthest down the bowel; and the follicles, where not dissolved away, were livid, turgid, and softened.

Case 2d.—C. B. a servant maid, had been ill twenty days from dysentery, preceded by an attack of bilious cholera.

Necroscopic appearances.—On first inspection of the contents of the abdomen the bowels appeared healthy. On a more close inspection, there were observed chiefly on the *cæcum*, several dark-coloured purple blotches, about an inch in diameter, which proved to be extravasation, as there was no surrounding inflammation; and when the parts were cut into, the ulcerations on the inside were not so deep as in some other parts of the mucous coat, accompanied by no external morbid appearances. The greater part of the transverse and all the descending colon, with the rectum, were regularly contracted to the size of the small intestines, without any such blotches as were seen on the *cæcum*. When the contracted bowel was laid open, there was presented a continued surface of small isolated ulcerations, granulations, and inflamed spots, which were slightly covered with pus and lymph. The muscular and peritoneal coats were much thickened; and in many parts an ochreous matter was observed, of the same nature as that which the patient voided for ten days previous to her death. The stomach was healthy.

Case 3d.—M. D. a female, 52 years of age, had been ill for seven days with the symptoms of severe dysentery, severe *tormina* and *tenesmus*, profuse sanguineous stools, which latterly degenerated into involuntary discharges of bloody water and mucus. These symptoms were accompanied with heat and pyrexia at the commencement, and a cold clammy skin with a sinking pulse in the latter stages.

Necroscopic appearances.—The small intestines were natural, or spotted with a few livid blotches, unattended with external or internal lymphous or muculent effusion. The upper part of the colon was contracted, and through its extent showing a dull livid colour beneath the peritoneal coat, which was sound. The internal surface of the colon, and more especially of the rectum, was of a purple and dark velvet hue, increasing in intensity towards the distal extremity. The mucous coat was abraded, ulcerated, and dissolved in many parts; and when the whole coats were seen by transmitted light, they presented the deepest injection of the capillary tissue. Nothing but a little grumous mucus was found in the lower bowels. The *sphincter ani* was quite relaxed and softened; and the mesocolic and hæmorrhoidal veins were much congested and very livid.

Case 4th.—A. S. a female, aged 36, unmarried, had been for six months an invalid from partial *hemiplegia*, and was for a fortnight affected with diarrhœa merging into dysentery.

Necroscopic Appearances.—The mucous coat of the stomach and small intestines was in many parts softened, and beset with slight follicular phlogosis; but the colon and *rectum* presented on the inner surface deep injection of the capillary vessels, extensive abrasions, ulcerations, and gangrenous mollescence, increasing in intensity towards the anus, on which was lodged some grumous water.

The disease then from every strictly observed symptom, as well as from inspection after death, appeared to be a true *colitis*, accompanied, in most cases, and terminating in a greater or less degree, in inflammation of the *rectum*, which often continued, under the chronic form, for a considerable time during confirmed convalescence.

Causes.—The *remote causes* which led to this visitation of dysentery, appear to be the season of the year, and the constitutional tendency to affections of the abdominal *viscera*, especially displaying itself in the mucous surfaces of the intestinal canal. The disease seemed to acknowledge no other cause of this kind but what was productive of the other congenerous affections,—diarrhœa and cholera. It differed only in point of sequence; and when the dysentery appeared as an initial disease, the constitutional causes appeared to have been so far modified as to produce in a direct manner that complaint which at first required the precursory affections to assist in producing.

About the latter period of the disease in the month of October, the malignant cholera made its first appearance at Sunderland; and, however severely the epidemic dysentery prevailed at Bolton, a little prior to the invasion of the *nova pestis* on our shores, still it was a matter of congratulation, that it had not appeared sooner and visited this place,—seeing at that time how prepared was the physical constitution of our inhabitants for affording it a favourable field for the display of its virulence. I was, indeed, so far possessed with the idea that the favourable disposition for its ravages among us was anticipated, that I ventured to say, that when the malignant disease would visit the place, it would meet with a physiological resistance from the recovered condition of the public health; and that in all probability such an epidemic would not soon occur among us. The result in some measure turned out accordingly; for in the autumn of 1832, when the cholera prevailed, with great mortality, at Liverpool, Manchester, and some other towns on this side of the island, Bolton escaped almost with impunity,—only about thirty-five having died of the disease out of a population of 50,000. During this last mentioned season the constitutional barometer kept high and steady; and I remember very few autumnal seasons since I have been in Bolton, wherein fewer bowel complaints prevailed. In this ungenial state of the public health, as a *nidus* for the malignant cholera, the few cases that appeared were sporadic, segregated almost in every instance; but, notwithstanding, displayed all the characteristics of the blue and asphyxial disease.

The *exciting causes* of the dysentery under detail, could, in many cases, be traced to intemperance in diet, especially to fruit and crude suppers,—exposure to evening chills after a hot day; but in as many instances, it was impossible to attribute the attack to any thing but an epidemic influence or miasm. All parts of the town, and all classes of the inhabitants were more or less attacked, though the disease was most severe among the operative classes and shopkeepers. In three instances I was much disposed to consider contagion to be the exciting cause among some females who were consecutively attacked,—they being not residents in the same family, but only temporary nurses. That dysentery assumes the contagious character is affirmed by many observers; but what degree of intensity or peculiarity of type constitutes its contagious agency, is a question that has not been resolved by the satisfactory evidence of unequivocal facts.

Treatment.—When the disease first made its appearance, I, in common with several of my medical brethren, had no idea that we had to contend with such an intense affection. In those cases of dysentery which I had been called to treat during fifteen years of private practice, I had seldom recourse to those heroic remedies, which I formerly had occasion to use in other and warmer climates among our seamen and mariners. Neither was I prepared, from the late writings of home practitioners, to meet with such an intense *phlogosis* of the colon and rectum. With these unprepared views, I trusted that the common remedies, in ordinary doses, as calomel, opium, antimony, and Dover's powder, with chalk mixture and other astringents, would subdue the complaint. Having also in the early cases, as precursors to this consecutive epidemic, the asthenic and debilitating diseases of diarrhœa and cholera, suspicion was not at first entertained, that a lesion of so much phlogistic intensity could supervene. The inefficacy of the above medicines, in ordinary doses, and even slight depletion when there was pain, soon convinced me, along with the evidence of limited dissection, that we had no every-day enemy to contend with. With this more enlightened view, I had recourse, when called early, to general depletion, which was followed by one or two applications of leeches to the groins and iliac regions. The first dose of medicine which I prescribed was from five to fifteen grains of calomel, according to the age and strength, combined with one or two grains of opium,—half-doses of both which were continued to be given every three or four hours afterwards, for the first twenty-four hours; and at the expiration of which period, castor oil was given until the bowels were freely evacuated. All solid and even pultaceous food were forbidden;—barley or rice-water only was allowed, and no other medicine administered; while fomentations and warm poultices were applied to the abdomen according to the pain and griping. Having effected relaxation of the bowels, which generally was accompanied with a great discharge of bile more or less vitiated, the calomel and opium in small doses were again exhibited every three or four hours, now combined with tartrate of antimony or antimonial powder, in the proportion of one-third of a grain of the former, or two grains of the latter, to three grains of calomel and half a grain of opium, in the form of pill, with the addition of a solution of subcarbonate of potass and a little nitrate of potass, to be taken with or without lemon juice, but always far short of saturation. Castor oil was again repeated on the next or subsequent morning, according to the relief of the symptoms, the perception of mercurial fœtor, the tenderness of the gums, or the supposed fecal elaboration that had taken place.

In acute cases in otherwise healthy individuals, these simple means, efficaciously exhibited and followed, arrested the disease in three or four days, the mouth becoming tainted, the tongue clean, the thirst less, the skin soft and perspirable, the alvine discharges free from blood, and almost from mucus, with a copious flow of bile and natural secretions; so that little more was necessary than to restrict the patient's regimen and diet for a few days longer.

When the opportunity of opposing the disease at an early period was lost, or where the patients were of a less plethoric diathesis, or otherwise enfeebled by the precursory diseases, a longer and more temperate course of treatment was instituted. In these cases, recourse could only be had to topical blood-letting, according to the severity and return of any fixed pain that could be detected on moderate pressure. Blisters applied to the hypogastric and iliac regions also were found to have a decidedly good effect, and were kept open by resinous ointments, according to the age and demands of the case. They always seemed to alleviate the *tormina*; but as in many other inflammatory diseases their effects were best obtained when the inflammatory tension was either naturally or artificially moderated. In these subacute cases, calomel was more cautiously and sparingly given; and often recourse was had to *Hydrargyrus cum creta* with opium or Dover's powder; from four to eight grains of the first with the same quantity of the last mentioned medicine, every four, six, or eight hours, till the *fæces* showed a decided tendency to their natural state—the pain and griping disappearing, on the mouth becoming tainted. One general maxim was not to disturb the bowels too often by even castor oil; and above all to avoid all drastic purges, as jalap, senna, and the resins. Neutral salts, as tartrate of potass, or sulphate of magnesia in small and repeated doses, were, however, sometimes given. Perfect rest in bed was enjoined, and a very restricted diet of demulcent or weak farinaceous food only was allowed; and in the inflammatory stage, milk was wholly interdicted.

When from the violence of the vascular fluxion, or the late or inefficient use of medicine, the disease fairly set into the stage of intermittent *tormina*, profuse sweats, soft pulse, with vitiated excretions of muco-purulent, shreddy, and gelatinous matters, with occasional streaks of blood accompanied with constant tenesmus, without any appearance of fecal or bilious matter, or where the evacuations became ochrey, orange, or brick-coloured, and of gruelly or purulent consistence, it required a considerable modification of treatment; for there was great reason to suppose that the villous coat had become abraded or ulcerated, or that the follicles had become enlarged, changed in their function, or tending to the sloughy ulceration. Calomel in these was almost relinquished, and where a mercurial course was required, the *Hydrargyrus c. creta* was the only preparation of this mineral that was exhibited. To relieve the painful tenesmus and procure rest, Dover's powder was given; but as it encouraged a weakening *ephidrosis*, I found that the addition of a grain or two of sulphate of quinine corrected the colliquative effect of the powder while the anodyne operation was obtained. Laudanum alone in small doses, or opium and ipecacuanha, along with *Decoct. Althææ*, or infusion of orange-peel, were found good remedies in this stage. The general condition of the patient's strength was often as much to be looked to as the local lesion; for often hectic or colliquative debility became so great, that wine was required and some animal nutriment, in addition to the farinacea. Milk was now tolerated, and seemed to agree, when given weak, and prevented from caking in the stomach by mixing it with sago gruel, or with a little lime-water To relieve the tenesmus, *enemata* of starch and laudanum were given, but always with great care, and as seldom as possible; for I found in two or three instances, that the rectum got more irritable, and quickly threw off the enemal burden.

In the ochrey evacuations, I found marked amendment in two cases from the sulphate of copper in doses of one grain combined with half a grain to a grain of opium, three or four times a day. The stools evidently showed the chemical effects of the mineral. The acetate of lead was not found serviceable. The great difficulty in some of these cases, was to proportion the opium, so that it would gently retain the mineral in the bowels, ease the tormina, and yet not produce any narcotism on the brain, which is much to be avoided. In this dilemma I have more than once found myself, and have been obliged to diminish the opium, with prejudice to its effect on the intestines. I then resorted to a little port-wine negus; for the pure narcotics could not be employed, and I also administered at intervals a teaspoonful or two of brandy in a little sago or gruel with good effect.

The tenesmus, which in some cases was very distressing, was best alleviated by *enemata* of starch milk-warm and laudanum, not forgetting to support the *rectum* well with a warm cloth, till the anodyne had begun to act on the rectal nerves. When *enemata* could not be endured, from the great tenderness of the lower surface of the bowel, the diffusible effect of small doses of laudanum was the best substitute. An oozing of muculent matters remaining during the latter stages, or during convalescence, was treated with warm enemata of lime-water with laudanum, and a wine glassful of the former was given twice or three times during the day with a little milk,—the calcareous solution serving to correct any acidity in the stomach and bowels, as well as to constringe the relaxed and debilitated textures.

As aphthæ in the mouth, *fauces*, and *œsophagus* were not unfrequent in the latter stages of severe colliquative cases, and sometimes had a very serious aspect, as well as attended with much soreness and *dysphagia*, the chlorides in mucilaginous gargles, with a few drops of the muriatic acid, were found effectual in dispersing the attack; though the complaint was very apt to be renewed after the surfaces had assumed a healthy appearance.

Notwithstanding the quantity and repeated doses of calomel and the mild oxide that were administered, the mouth seldom became much affected; nor was it desirable to be so;—the liver seeming to be the great emunctory by which the abdominal viscera were relieved, which being affected by a copious and continued flow of bile more or less vitiated, the exhibition of the mineral was either suspended or intermitted. The fear of permanent infarction or organic change in the liver not being of any amount to what it would have been in the same affections occurring in warm climates, the full exhibition of mercury was judged to be less necessary.

Though the bowels in several cases suffered severely and long under every variety of dysenteric discharge, with long persistent tenesmus, oozing from the anus, and pain on passing a firmer stool than usual, still they, who had held out through the acute stage and its immediate effects, eventually escaped without any chronic ulceration or injurious change of texture, the complaint fading off into simple laxity of the bowels, and gradually into perfect recovery, as many now living in health and strength bear witness.

When diarrhœa, or rather a simple solution of the bowels, remained, from apparent debility of the muscular fibres of the intestines, accompanied with a diffluent state of the secretions, recourse was had to a short course of the *Decoct. Hæmatoxyl.* or *Infus. Calumbæ*, with *Tinct. Camph. comp.* and enjoining a free diet of animal food, with a cautious use of port wine.

As the disease affected children, it was remarked how very speedily their bowels, as I have already noticed, seemed to recover from the very probable solution, and, I may say, disintegration they underwent. In a few days after their evacuations had been of the severest kind, as to quantity, and loaded with bloody mucus, lymphous shreds, and sloughs of a gangreniform matter, the stools would become natural, and the morbid discharges would totally cease, leaving the little patients in a fair state of convalescence. The speedy reintegration of diseased bowels has been observed by others in other cases of children, the mucous coat in their bowels being easily injured and as quickly repaired, from its great vascularity and organic sensibility.

Since the period of this epidemic, dysentery has never appeared in the town in any remarkable manner, beyond the sporadic attacks that generally occur in the autumn of each year, but which very seldom require general or topical bleeding, such as in the intense cases under notice was found necessary. As the epidemic was ushered in, and was accompanied during the half of its course with cholera, fever of a typhous character followed close in its train, among the working and lower classes, and continued more or less during the first months of winter, after dysentery had totally disappeared.

Bolton, 1*st August* 1835.

Art VI.—*Observations on Continued Fever, as it occurs in the City of Glasgow Hospitals.* By Robert Perry, M.D. Physician to the Glasgow Fever Hospital.

To the Editor of the Edinburgh Medical and Surgical Journal.

Sir,—To avoid the charge of presumption in sending the following propositions for insertion in your widely circulated Journal, the following statement is deemed necessary.

In the year 1831, when contagious typhus was so unusally prevalent in Glasgow, that not above half the applicants for admission could be received into the fever wards of the Royal Infirmary, although there existed accommodation for upwards of 130 patients, a temporary hospital required to be fitted up for their reception. Accordingly, the Mile End Hospital, containing 120 beds, was hastily fitted up, and opened on the 9th January 1831, for the reception of fever patients, and their medical management committed to my charge, with the assistance of a clerk and apothecary. By the 1st .of February, 180 patients had been admitted, and by the 1st of March 387. The house continued to be much crowded till the end of May, when the epidemic began to abate, and by the beginning of July had so far diminished, that the fever wards of the Royal Infirmary were found sufficient to accommodate all who applied for admission, and the Mile End Hospital was shut up in the beginning of August.

During these seven months, 1145 cases were treated by me to a termination. Of these there died 57 males; 39 females; in all 96, including four fatal cases of cholera. Of this number there were 19 relapses, averaging one in 60; and I was particularly struck with the fact, that these relapses were almost altogether cases of true typhus, occurring in patients who were previously admitted, labouring under some local inflammatory affection, and who had caught the fever in the house, and were either seized with it before being dismissed, or soon after leaving it,—not an instance having occurred of any one returning with fever, who had previously undergone the disease. The incorrectness of calling *these* cases of relapse is quite manifest; as it was an entirely new disease; and if I am correct in the propositions I have laid down respecting fever, it is as absurd to talk of a relapse of typhous fever, as to talk of a relapse of small-pox or measles. When an increase of fever takes place after the crisis of typhous fever, it is owing to the existence of some other disease.

In August 1833, I was appointed one of the physicians to the Glasgow Royal Infirmary, and began on the 1st November 1833 to take charge of the fever cases. Into the fever wards, now containing accommodation for nearly 300 patients, were admitted all contagious diseases; and during the spring and summer of 1834, there were admitted a considerable number of cases of scarlatina and measles; and in the end of 1834 and spring of 1835, there were admitted upwards of one hundred cases of severe small-pox, besides a number of acute inflammatory cases, sent in as typhous fever. I endeavoured as far as possible to classify and separate these cases while in the acute wards; but this was not so easily managed when they were sent to the convalescent wards; the consequence of which was, that several who had not been vaccinated caught small-pox; others who had had small-pox in the hospital, caught typhous fever; while some caught scarlatina by mixing together while in the convalescent wards. The number altogether admitted from 1st January 1834 till 1st January 1835, was 2003. Of those who died, there were few indeed that I did not carefully inspect, and caused notes to be taken of the morbid appearances of the different viscera. Since January 1835, 1200 more patients have been admitted, and the same practice diligently continued, the only object in view being to ascertain facts.

Having on various occasions during the discussions in the Glasgow Medical Society, mentioned such facts as were the result of my observation in typhous fever; and as these, being at variance with the commonly received opinions, and with the experience of the rest of the members, were received with incredulity; though their importance, providing they could be substantiated, was fully admitted; it was therefore agreed at the last meeting of the Society in May, to appoint by ballot a commission of five of the members, to visit from time to time the wards of the fever hospital, and to attend at the inspections, when I agreed to point out the facts upon which the statements and opinions contained in the following propositions were founded. It was also agreed that the commission should report to the next meeting of the Society, which takes place on the first Tuesday of October. The gentlemen appointed were, Dr John Macfarlane, Dr William Young, Dr William Weir, Dr John M. Pagan, and Mr George Watt, *Convener*.

The subject of fever is of itself so important, that every fact that can throw light upon it, is calculated to arrest the attention of all professional men who are not in their own estimation already perfect. The facts I have stated, and the means taken to substantiate or refute them, have excited among the profession here considerable interest; but the whole circumstances not being fully known, much misapprehension and consequent misrepresentation exists. I do not pretend to say that all my observations are new. Many of them have been made by others before; but not one of them is stated upon slight grounds, or on the faith of others, or is not the result of, or confirmed by, my own observations. Every one who comes forward to state any thing not generally received, must be prepared in the first instance to be met by a denial of the facts, and when the evidence can no longer be resisted, to be told that, even if true, there is nothing new. Whether new, or true, I leave to those who will be at the pains to examine for themselves to judge. Though possessed of ample materials to make a book, I have no desire to become an author, or add to the mass of conflicting opinions and theories. If the result of my experience be of any use in correcting erroneous opinions, or fixing on a firmer basis any previously noticed facts, and thereby benefiting the public, my object will be attained.

1st, That typhous fever is an idiopathic disease solely produced by contagion, that is, by the introduction into the system of a specific animal poison.

2d, That this specific poison is (as far as yet known) only generated in the human body during the course of this idiopathic fever.

3d, That no other fever, arising either from general causes, as cold, fatigue, improper ingesta, local lesions, or marsh miasmata, is capable of generating this specific poison, or, in other words, producing contagious typhus.

4th, That this contagious idiopathic typhus runs a certain course, which may be modified, but cannot be checked, and is distinguishable from all other fevers by certain symptoms, which in a greater or less degree are uniformly present during its course.

5th, That the following is the usual course of the symptoms by which contagious typhus may be distinguished; viz. languor, nausea, frontal headach, rigors, loss of strength and appetite, followed by increase of thirst, quickened pulse, heat and dryness of skin, pain of back, or general soreness over body. The tongue becomes white at base and centre, florid at tip and edges, and on the fifth day from the first attack of headach, rigors, or nausea, a reddish, slightly elevated, but irregular papular* or measly eruption, is sometimes sparingly, at other times thickly scattered over the trunk and limbs, but rarely appearing on the face. As the fever advances in severity, the frontal headach abates, the tongue becomes dry and brown in centre, the eyes dull, heavy, and suffused, the pulse quicker, the thirst more urgent, the skin more dry and warm, and the mind disturbed. On the sixth day the eruption becomes more general and distinct, like rubeola, occasionally fading or disappearing suddenly, and becoming, as the disease advances, flattened, and of a darker or duskier hue; and when the fever is accompanied with congestion of the brain or lungs, or by thickening of the lining membrane of the bronchial tubes, it assumes that livid appearance usually called petechiæ. This eruption, when slight, frequently disappears in a few days, but more frequently is visible during the whole course of the disease.

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* The term papular does not convey a correct idea of the eruption, as it is not pointed; but I do not know a better to substitute for it.

6th, That simple unmixed contagious typhus usually continues for fourteen days from the first attack, when the febrile symptoms abate, the eye becomes clearer, the skin softer, and the mind composed, with less thirst. There is often a slight abatement of the symptoms on the tenth day, and particularly in children, at times nearly complete.

7th, That when the febrile symptoms continue beyond the fifteenth day without abatement, local lesions exist, to which must be attributed the longer continuance of the febrile symptoms. The appetite frequently continues defective till the twenty-first day, when all the functions resume their healthy action.

8th, That contagious typhus is often to be met with in combination with other diseases, usually of a local character, as of the lungs, the mucous membrane of the stomach and intestines, more particularly the aggregated glands of the ileum, or the membranes of the brain.

9th, That by the local diseased action of the parts abovementioned, the febrile action of the system is kept up; but the character of the disease is changed, and in such cases it frequently goes on to a fatal termination, or abates upon the twenty-first day from the commencement of the disease.

10th, That between the ages of seven and fifty, sixteen out of twenty are susceptible of being affected by contagious typhus, if exposed to the contagion, and not protected by having previously had the disease; but that children under five years are rarely affected with contagious typhus, and under two, may generally continue to suckle or sleep with the mother labouring under typhus, without catching the disease.

11th, That contagious typhus is an exanthematous disease, and like small-pox, measles, and scarlet fever, during its course produces some change on the system, by which the individual having once undergone the disease, is (as a general rule) secured against a second attack, and may with impunity expose himself to the contagion of typhus, if he continues to reside in the same country in which he previously had the disease. In those cases which are exceptions to the general rule, the disease appears in a mild and modified form, the crisis taking place on the seventh, ninth, or eleventh day.

12*th*, That contagious typhus never exists in combination with any of the other contagious exanthematous diseases.

13*th*, That in every case of pure typhus, the blood undergoes, during the disease, a considerable change, becoming darker in colour, and in many cases losing the power of coagulating when drawn from the arm, and in all cases being more loose in texture; and when death ensues during the course of the disease, the blood contained in the heart and large vessels is dark and fluid.

14*th*, That inflammation of the membranes of the brain, of the bronchia, and of the mucous membrane of the stomach and intestines, and various febrile affections arising from cold, fatigue, improper ingesta, &c. &c. more particularly disease of the aggregated glands of the ileum, and the mucous follicles, often termed *dothinenteritis* or *gastro-enteritis*, have been too often confounded by medical practitioners with typhous fever, though they are characterized by dissimilar symptoms, and require a very different mode of treatment.

15*th*, That the congested state of the vessels of the brain, the serous fluid on its surface, and the dark fluid state of the blood, are the most common morbid appearances to be met with in *post mortem* inspections of those who have died of contagious typhus, and in many cases the only morbid appearances which are to be found; and the next in frequency is the thickening, or darker appearance of the bronchial lining membrane, and the third in order is the diseased state of the mucous membrane of the intestines, more particularly that of the aggregated glands of the ileum. The relative proportion of these states to each other vary considerably, according to the state of weather, as to heat, dryness, &c.

16*th*, That *dothinenteritis*, or enlargement of the mucous follicles of the smaller intestines, and enlargement and ulceration of the aggregated glands of the lower third of the ileum occur in combination with contagious typhus, and are to be met with in about one in six of those who die from typhus. It also exists as a disease *per se*, and is characterized by the following symptoms;—quick irritated pulse, tongue dry and florid, more particularly at the tip, often fissured in the centre, urgent thirst, partaking of the remittent character; the face is alternately flushed and pale, particularly one or both cheeks. The disease commences frequently with diarrhœa, which lasts from three to four days, when it ceases, and the stools become for a time natural; the patient complains on pressure of pain in the epigastric, or in the right and left iliac regions; and the abdomen is slightly tumid, and has a puffy feel. As the disease advances, the patient is often seized with vomiting of a greenish fluid, which is always an unfavourable symptom. The dull suffused eye, frontal headach, low delirium, and decided *anorexia*, so characteristic of typhus, in nineteen cases out of twenty, are in this disease absent. This disease may exist in every degree of mildness or severity, having no regular period of termination; it may run on for two, three, or even four weeks, and terminate in gradual restoration to health, without any sensible crisis; or the patient may sink under it from exhaustion, or by hemorrhage from the bowels, or it may end by some of the ulcers of the aggregated glands of the lower third of the ileum, penetrating the coats of their intestines, and part of their contents being effused, exciting *peritonitis*, under which the patient sinks in the course of two, or, at most, three days.

The less compressible state of the pulse, the clearness of the eyes, the flushing of the cheeks, the more florid, parched, and fissured state of the tongue, the comparative absence of the frontal headach, and the complete absence of the typhous eruption, sufficiently distinguish this disease from contagious typhus. To a practised eye, the colour of the face, the flushing of one or both cheeks, the clear eyes, and the irritative state of the pulse, are sufficient to distinguish this diseased state from typhus. When in combination with typhus, all the symptoms are aggravated in severity after the fourteenth day, and become more distinctly marked. This disease is an equally frequent accompaniment of small-pox as of typhus, and presents the same morbid appearances on inspection after death. In those who have died of this disease of the mucous membrane of the intestines, the blood in the heart and large vessels presents the same appearance as in those who have died of chronic inflammatory disease, in this respect differing from its appearance in typhous cases.

The observations on which these facts are founded were not made to establish any theory. The reports of the cases and the necroscopic inspections are made in the presence of all who choose to witness them. The facts only are stated, and all are at liberty to draw from others their own conclusions.

These sixteen propositions, the result of careful observation in upwards of 4000 cases, and 300 necroscopic inspections, are considered as facts fully ascertained. The following are believed, on sufficient evidence, but which cannot as yet be adduced to prove them.

1*st*, That typhous fever does not become infectious before the ninth day, and is most contagious when the patient is in the convalescent state, when cuticular desquamation usually occurs.

2*d*, That the contagious poison is chiefly spread by the desquamation of the cuticle during the period of convalescence.

3*d*, That the earliest period of the disease making its appearance after exposure to contagion is eight days, more frequently fourteen, and sometimes as long as two months.

4th, That in every case of genuine typhous fever, the vessels ramified upon the *pia mater* are more or less enlarged or congested, and throw out a serous fluid betwixt the convolutions of the brain and on its surface, which to a certain degree compresses the organ, and impairs its functions, and, along with the morbid state of the blood, is frequently the cause of death in this disease.

16, *St Vincent Place, Glasgow.*

ART. VII.—*Experimental Researches on the Nerves*; a Letter from Professor BARTHOLOMEW PANIZZA to Professor MAURICE BUFALINI. Pavia, 1834. Translated from the Italian by DAVID CRAIGIE, M. D., F. R. S. E., &c. &c.

SINCE this paper was first translated for insertion in the Edinburgh Medical and Surgical Journal, considerable portions of it have been published in several numbers of the London Medical Gazette. The arrangement observed in that work is, however, somewhat different from that followed by Professor Panizza himself. Without presuming to offer any opinion upon that mode of arranging the paper, which may possibly have some advantages, we think it best to adhere to our original plan, of giving the whole letter of the Professor as it stands, that our readers may be enabled to judge for themselves on the difficult and obscure questions in Physiology of which it treats.

Before explaining the result of my experiments on the Communicating Nerve of the Face, on the Fifth pair, on the Hypoglossal, on the Glosso-pharyngeal, and upon the Spinal nerves, I wish you to know what I happened to observe regarding the communication of the intercostal with the spinal nerves, as a matter which may interest your curiosity. Upon this point, as you are well aware, anatomists have been always at variance; some asserting that the intercostal is united only with the bundle of the anterior roots of the spinal nerves; * others, on the contrary, representing the union to be with the bundle of the posterior roots; † and others representing them to be connected with both the bundles of the same nerves. This discordance must proceed only from one of two causes; either from the circumstance of that communication not observing a constant law, so that it takes place in the various modes indicated, or rather from the investigation not having been made with the requisite diligence and minuteness.

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* Schmidt, *Commentarius de Nervis lumbaribus*, &c. p. 19.

† Scarpa *de Gangliis nervorum, deque Origine et essentia Nervi Intercostalis*. Epistle to Weber, inserted in the Annali Universali de Medicina, May and June 1831.

Since the point of communication between the intercostal and the spinal nerves varies in different subjects, taking place in some in the vicinity of the spinal ganglion, in others at a greater or less distance from that ganglion,—it is not to be doubted, that, in order to clear up this controversy, it is proper to examine not those cases only in which the union is made near the ganglion, but those in which it takes place at a distance from the same; because in the former, the two bundles of the roots being still apart, the insertion of the communicating branch is manifest; whereas in the latter, the same bundles being mingled and interwoven in a thousand directions, it becomes difficult, if not impossible, to determine to which the said branch is united. With this view, so long as I have held the Chair of Human Anatomy, I have by manifold observations satisfied myself, that both the roots of the spinal nerves concur in the communication with the intercostal, as the illustrious Scarpa, in his excellent work published fifty-four years ago, expressly says, in the following terms. "I have seen, however, in each spinal nerve some filaments of the anterior root and some of the posterior root recede from the spinal trunk a little below the ganglion, and meet towards its anterior surface in one branch covered by a common investment, which then joined the intercostal nerve." (*Anatom. Annotat.* Lib. i. § xi. p. 18.) With this also accords the observation of the celebrated Soemmering, in the following statement. "The posterior root of the spinal nerve having formed a ganglion is united with the anterior root into one nerve, so that both roots, the posterior and the anterior, contribute to form the sympathetic nerve. Sometimes, when the matter is rather hastily examined, it appears to be composed of branches issuing chiefly from the anterior root; but this idea is contradicted by more careful examination." (*De Corporis Humani Fabrica*, T. iv. § clviii.) My numerous observations, indeed, I repeat, and those of my distinguished assistants, Drs Beolchini and Novati, prove that the first opinion of Scarpa is undeniable. If your engagements and pursuits could admit of your coming hither, which I earnestly desire, you would see in this Museum the preparations which demonstrate this truth, viz. that the filaments of the branch or branches of communication between the intercostal and the spinal nerves are united partly with the anterior and partly with the posterior roots of the spinal nerves.

It is, on the other hand, requisite for you to know, that the opinion hitherto prevalent among anatomists is not absolutely agreeable to the fact, viz. that the branches of the first cervical ganglion of the intercostal nerve, which ascend along the carotid artery, entering the cavernous sinus, communicate there with the sixth pair of cerebral nerves, so that this nerve, on the authority of Bock, becomes larger and flatter, and is drawn something downwards. From repeated observations I can assure you, that these branches of the intercostal nerve, without exactly communicating with the sixth pair, are merely lost and closely entwined round this nerve, whence it is practicable, by diligent manipulation, to detach it from these branches without injuring their continuity, as it may be separated from the carotic ganglion, which lies between that nerve and the carotid artery, without injuring either the one or the other.

It is sufficient for me to assure you of these important anatomical facts. I now come to the subject which I propose to myself, namely, to the experiments performed by me on the various nerves, the use of which was controverted or unknown.

You are aware that the ancients did not fail to speculate on the nature and the functions of the nerves, and also, that some thought of distinguishing the nerves into sensitive and motive,—a distinction which would neither have been announced as a simple doubt, nor thereby consigned to oblivion, if it had been derived from facts and experiments rather than from speculations. The first among the moderns who expressly engaged in this inquiry was assuredly Professor Bellingeri,[*] and afterwards Sir Charles Bell, who, by means of experiments and pathological observations, illustrated so fully this point of physiology, that it appears, as well to Magendie, as to others and myself, that nothing more is left to be desired.

With the object specified, I had undertaken since the year 1825 a series of experiments on different live animals, as the frog, rabbit, cat, dog, horse, sheep, goat, and with the successive aid of distinguished anatomical assistants, Drs Zarda, Beolchini and Novati, in the presence of several physicians, and of the celebrated Scarpa, as well as of my colleague and friend Dr Rigoni, Professor of Physiology. Every year in my public lectures have I briefly announced the results of several of these experiments,—they being already made known by Scarpa in his two letters to Weber. If, therefore, I have delayed till now to satisfy your wish, namely, to explain the manner in which I proceeded in the experiments, and to state the results, ascribe it to the other anatomical pursuits with which I was occupied, and in some degree to that principle which has ever guided me, viz. to take more care in confirming facts, than haste in publishing them. Coming, then, to details, I shall speak shortly, first, of the communicating nerve of the face, then of the fifth pair, of the hypoglossal and glosso-pharyngeal nerves, and, lastly, of the spinal nerves.

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[*] Dissertatio Inauguralis quam publicé defendebat in Regio Athenaeo die 9 Maii, anno 1818, Aug. Taurinorum.

I.—*Of the Communicating Nerve of the Face.* (*Nervus Septimus sive Facialis*, Soemmering.) *Portio dura.* Small Sympathetic of Winslow.

1. The rabbit and the horse were the two animals in which I divided the communicating nerve of the face, as being the most convenient for the purpose; since, besides the great mobility of their lips, the motion of the aperture of the nostrils is most manifest and isochronous with the motion of respiration. In the rabbit, after the hair has been removed from the skin corresponding to the maxillary *ramus* and the zygomatic arch, it is requisite to make, after a transverse wound of the skin, a vertical incision from the lower margin of the zygomatic arch near its temporal end, and two lines distant from the external angle of the palpebral commissure, for the space of about seven lines of the Paris foot, towards the angle of the maxillary *ramus.* After making this incision, and separating the lips of the wound, cutting the thin layer of cutaneous muscle (*panniculus carnosus*,) and the cellular tissue covering the masseter muscle, immediately appears, resting transversely on that muscle, and before the anterior margin of the parotid gland, the communicating nerve, which consists of two filaments somewhat flattened, and generally united by an intermediate minute twig. The nerve being exposed, by passing beneath it a curved needle with a blunt point, isolated from the subjacent muscle; and if it be divided by a pair of sharp scissors, it is observed, 1*st*, that the corresponding nasal aperture, as well as the lip, remain folded and carried towards the opposite side; 2*d*, that the nasal aperture, instead of being moveable according to the rhythm of respiration, remains shut and immoveable, unless there take place a complete motion of the *pinnæ nasi*, communicated probably from the opposite nostril, where the motion is most evident. To assure myself of this, I divided the communicating nerve of the opposite side; and the *alæ* and the upper lip became completely and permanently immoveable. Sensation, notwithstanding, remained unimpaired, so that when the upper lip was touched with a fine needle, the animal immediately shrunk with pain,—a symptom of sensibility which it equally exhibited, when one communicating nerve only was divided, whether it was punctured on the side on which the nerve was divided, or that on which it was entire. These phenomena were uniformly observed upon many rabbits on which I repeated the experiments.

The communicating nerve of the face in the horse was divided in the following manner. The animal being secured and placed on the ground, after dividing the skin, a vertical incision is made of from three to four inches from the most prominent part of the zygomatic process of the temporal bone towards the angle of the jaw, parallel to the posterior margin of the maxillary *ramus*. When the lips of the wound are separated, immediately is seen the communicating nerve of the face, which is first covered by the anterior margin of the parotid gland, then dividing into two branches a little apart from each other, runs over the masseter muscle. The nerve being thus exposed, there is passed below it a sharp needle with a thread, and having ascertained by raising the thread that the two larger branches are included, by means of very sharp scissors the nerves are divided transversely without touching the artery which runs between them. On division, the animal betrays signs of much pain, and the following results ensue.

Deficiency of motion of the corresponding nostril and corresponding part of the lips, which were folded to the opposite side, and hanging down mostly to the lower one; the nasal *ala* of the same side, though by itself quite immoveable, received, however, a slight motion from the whole body of the opposite nostril. When the opposite communicating nerve was divided,—an operation attended with some pain,—all motion of the nostrils ceased,—that having been sufficiently remarkable before the operation, by the animal being very short-winded. The *alæ nasi*, therefore, which previously were dilated in inspiration, remained depressed and entirely motionless, were collapsed, being carried mechanically by the pressure of the external air towards the *septum narium*, from which cause, by reason of the difficult entrance of the air, the animal was attacked with such difficult breathing, that he appeared every moment threatened with suffocation, which would assuredly have happened, if the person to whom he belonged had not wished to destroy him. The lips were paralytic and dropping, so as to expose all the incisor teeth of the lower jaw. Yet they still retained the most exquisite sensibility.

The great sensibility evinced by the animal to touch, and upon the division of the communicating nerve before the parotid gland, led me to doubt whether any communication had yet taken place between it and the fifth pair. And upon examining it from this point to the stylo-mastoid hole, I found, indeed, that below the parotid gland a large branch of the third division of the fifth pair unites with the communicating, so that division of the latter in the point specified comprehended even the said branch.

With the view, however, of distinguishing the effects of division of the communicating nerve, I always took care in the successive experiments to perform it on this side of its junction with the branch of the fifth pair;—an operation sufficiently difficult and delicate, in consequence of the many remarkable venous vessels which unite beneath the parotid gland and round the nerve. And I was so much more concerned to perform this operation, that as well in the rabbit as the ox and dog, the same communication takes place between the two nerves specified; and in the rabbit, division of the Communicating alone is impracticable, because it lies deep under the parotid gland, surrounded by venous plexuses, the injury of which is inevitable, and causes mortal hemorrhage. On the horse, on the contrary, it may be accomplished in the following manner.

After making the cutaneous incision already specified, and separating the lips of the wound, the parotid is cautiously detached from the subjacent masseter muscle and the maxillary *ramus*, and is gradually reflected until the communicating nerve is seen before its union with the branch of the fifth pair. Among the many large veins found under the parotid, principally towards its upper extremity, is the masseteric, which, emerging from the masseter muscle below the zygomatic process, sinks into the gland, unites with others issuing from the orbit, and opens into the jugular vein. As these veins are successively met with, if they cannot be avoided, it is proper to tie them, particularly the masseteric vein now mentioned, to which two ligatures must be applied, one at its emergence from the masseter muscle, the other at the part of the parotid behind the condyle of the lower jaw, where it unites with the veins proceeding from the orbit. The gland being thus pushed aside, the posterior margin of the masseter muscle and the maxillary *ramus* appears below, and upon these the communicating already biparted, as well as the branch of the third division of the fifth pair higher up, which runs along the neck of the condyle of the lower jaw, then unites with the upper portion of the other nerve at an acute angle. The communicating nerve is carefully detached and divided by sharp scissors, without the animal giving any indication of pain. The effects which immediately ensue are as follow. Total loss of motion in the muscles of the upper and lower lip of the corresponding side, as well as of the *ala nasi*. Whenever the lips and the *pinna* are pricked or plucked by the fingers, or by forceps, the animal gives uniformly the most manifest signs of pain. If the communicating nerve of the opposite side and in the same point be cut, and the animal be left at liberty, it is an interesting sight to observe how entire sensibility is maintained, while the lips hang down quite paralytic; and when the animal raises the head, the lower lip falls back pendulous, so as to display all the incisor teeth of the lower jaw, and the inner surface of the lip. The apertures of the nostrils are rigid and immoveable, so that the entrance of air is impeded, and respiration becomes laborious, and is performed not without great distress and most laborious panting. In my experiments I presented a pitcher of water to the horse; but although the animal showed every desire to make the liquid enter the mouth, he could not drink a drop, from the complete immobility of the lips. I offered him successively oats and hay; but of the oats, notwithstanding the force which he used, he did not succeed in picking up a single grain, grasping them by the teeth, which he pressed against the bottom of the vessel; and of the hay he could take only very little, widening his jaws by the aid of the teeth alone.

After repeating these experiments several times, and with uniform results, I was desirous to divide the superior maxillary nerve immediately on its emergence from the infra-orbital hole. For this purpose I made choice of the rabbit and the horse.

II.—*Experiments with the Fifth Pair.*

In the rabbit, having ascertained well the position of the infra-orbital hole, practice taught me that, without exposing the nerve, it is best to divide it along with the other soft parts by a single transverse incision of the length of four Paris lines, penetrating to the bone at the region of the *foramen*. As the facial vein is sometimes comprehended in this incision, there ensues a hemorrhage, which may be arrested, if need be, by ligature of the vessel. The division of this nerve is immediately followed by total loss of sensation, so that if the upper lip of the corresponding side be pricked or cut, the animal gives no sign of any uneasiness, while, on the opposite side, scarcely does the point of the needle or edge of the scalpel touch the upper lip, when the animal springs up or otherwise starts, from the high sensibility, and which sensibility is equally and suddenly destroyed by division of the other superior maxillary nerve. No less, however, the motion as well of the lip and of the nose continues, whether a single nerve or both are divided. This experiment repeated several times always afforded the same result.

To support these facts by stronger evidence, I was desirous to perform the experiment upon the horse, in which the superior maxillary nerve at its exit from the infra-orbital hole is remarkably large, and liberally distributed to the *ala nasi* and the upper lip, interweaving itself wonderfully with filaments from the communicating nerve of the face. The infra-orbital hole in this animal corresponds to the plane of a horizontal line drawn from the maxillary spine to the median line of the mouth, and nearly to the outside of the point of the middle of that line. The emergence of the nerve or the situation of the infra-orbital hole being thus determined, a vertical incision is made in the skin in the point fixed on, beginning half an inch above the horizontal line indicated, and prolonging it about two inches under the same. The lips of the wound are then separated, the subjacent cutaneous muscle is divided, taking care to tie the minute arteries encountered and divided; and thus is exposed a descending muscle, which is the *levator alæ nasi labiique superioris.* This muscle is carefully moved towards the internal side, and below it appears the nervous *fasciculus* of the maxillary. If the accompanying artery be such as to lead to the apprehension of an uncontrollable hemorrhage, it is proper to detach, tie, and divide it. In other cases there is quickly passed under the component filaments of the nerve, sliding over the bones, a large blunt needle somewhat bent, or a common probe bent; by this the filaments are raised, and being assured that all are included, they are divided by means of sharp scissors. This division is performed as near to the infra-orbital hole as possible, because the filaments are there most united, and all are now easily comprehended, and no conjunction has yet taken place between them and those of the facial,—a circumstance which occurs only about one inch from the *foramen.*

As the superior maxillary nerve is most sensible, it results that on the irritation and the division of this nerve, the animal gives signs of intense pain. After the section the sensibility of the corresponding part of the lip and nostril is completely annihilated, so that whether it be pricked or pinched in any mode, the animal evinces no perception; while the motions of the same lip and *ala nasi* remain, and the sensibility of the opposite side is unimpaired. After division also of the other maxillary nerve, the horse being left at liberty, whatever injury is done to the upper lip and the outline of the nostrils, he offers no indication of uneasiness, while the motions of these parts continue, and the nostrils are freely dilated in inspiration. Nor does any other result ensue, when we divide on both sides that branch of the third division of the fifth pair, which is interwoven with the facial nerve below the parotid gland, which branch seems merely to be distributed to that region of the skin which is above the infra-orbital hole, without extending to the lip.

I said simply that the motions of the upper lip continue, and that the *alæ nasi* are freely dilated on inspiration. The motion of the nostrils indeed is performed as perfectly as before the division of the fifth pair. But it is not so with that of the upper lip, which, although it still moves, no longer moves regularly, and is no longer fit for the prehension of food, or to concur in mastication, or as appears to me, to suction of drinks, since the animal immerses the mouth in water without drinking. The reason of so great a difference between the effects which are recognized in the motions of the nostrils and in those of the upper lip after the abolition of sensation, is, if I mistake not, that the former, as connected with a series of instinctive motions, are accomplished and co-ordinated independently of the will, whereas the others being voluntary, cease to be co-ordinated as soon as through them the influence of the will ceases, which must necessarily be diminished in a part which no longer feels the contact of bodies, and which is no longer felt. This statement is so correct, that a horse in which after the division of the two superior maxillary nerves, the two branches going from the inferior maxillary to the facial had been left uninjured, when he immersed the mouth in water, drank some by the contact which he felt above the lip, though the lip itself was quite insensible. But of the cause of this fact I shall speak more fully afterwards. These experiments repeated several times gave always the same results.

III.—*Experiments to determine the Nerves of Taste.*

You know well that among physiologists the opinion regarding the nerve which presides over the sense of taste has always been the subject of controversy. The majority of physiologists, indeed, agreed in ascribing this faculty to the lingual branch of the fifth pair, chiefly upon the evidence afforded by the experiments of Magendie and the assertions of Sir Charles Bell. Others, however, either dissatisfied with these experiments, or persuaded by observations of their own, assigned this function rather to the hypoglossal; while some also among the moderns imputed it to both nerves together, as that which results from the combination of both. Nor again are there wanting some who joined to these nerves the glosso-pharyngeal. But the majority of physiologists, particularly since the time of Sir Charles Bell, regard this nerve as the one which presides over the motions of deglutition, and the hypoglossal as that which regulates the voluntary motions of the tongue. The extraordinary part of this speculation is, that among the arguments by which the various opinions were supported, was uniformly the anatomical distribution of each nerve; so true is it that prejudice obscures the observation as well as warps the judgment.

This endless controversy, the condition of the other organs of sense which are supplied with a particular nerve, the consideration of the function of the fifth pair in the face, and diligent anatomical examination of that nerve, showing that in structure it differs not from its other branches, and lastly, examination of the glosso-pharyngeal, led me to doubt the soundness of all the doctrines proposed upon this subject, and to undertake a series of experiments on living animals, with the view of ascertaining, by an infallible mode of inquiry, what function is performed by each of the cerebral nerves which are distributed to the tongue. I commenced my researches with the hypoglossal nerve; then I proceeded to the lingual, and lastly, to the glosso-pharyngeal. I selected among the various animals the dog, as the one which combines with great mobility of the tongue, an exquisite sense of taste, without, however, neglecting to extend my researches to other species of animals.

The Hypoglossal.—1. To expose the hypoglossal nerve in the dog, the following method is employed. The animal being secured by the paws by means of ligatures, and muzzled, is placed on the back on a table, so that the occipital region rests on its margin, with several folds of cloth beneath. Two assistants hold the animal by the paws, a third by the mouth, and a fourth assists the operator. Then, after a transverse incision of the skin, either we make a single incision along the median line, beginning about one inch above a line drawn from one angle of the jaw to the other, and extending to an inch below the body of the hyoid bone, or we make two lateral incisions in an oblique direction between the angle of the jaw and the *cornu* of the hyoid bone of the corresponding side. The first method I found most expeditious, and adhered to it. After the median incision of the skin, the latter is gradually separated from the subjacent cutaneous muscle to the point indicated by the lateral incision; at this the cutaneous muscle is divided, the subjacent cellular tissue, which envelopes at once the lingual artery and the nerve sought, is gradually raised, and the nerve thus exposed and detached from the artery by means of a probe passed beneath it, is divided. In this operation, it is proper to proceed close on the hyoid bone which serves for a guide, since a little anterior to it, the nerve is insinuated under the mylo-hyoid muscle, which it will be requisite then to divide.

2. The exposition of the lingual branch of the fifth pair is in like manner made either with a single integumental incision along the median line, extending from the *os hyoides* to about one inch distant from the *symphysis menti*, or by two lateral incisions, each of which commences in the furrow between the *os hyoides* and the depressor muscle of the lower jaw, and along the tract of the inner margin of that muscle, comes to the point indicated in distance from the chin. According to the first process, which I preferably employ, after the division of the skin, the latter is detached from the subjacent cutaneous muscle as far as the line indicated by the lateral incision, that is, to the margin of the depressor muscle. Here the cutaneous muscle is either divided or forcibly raised; and the mylo-hyoid muscle, which lies immediately below, and in the direction of one line

equidistant from the median line and the lower margin of the jaw, is cut for a certain space according to the bulk of the dog, that is, from the space of half an inch to one inch. The margins of the divided muscle are then reverted, and, along the inner margin of that portion which is attached to the lower jaw, are discerned the branches of the lingual nerve. This, however, is not the point for dividing it; since first it sends a filament, which, running along the *genio-glossus* muscle, proceeds to the *frenum* of the tongue. It is therefore proper, behind the track of the exposed branches, to penetrate more forward, raising gradually the thin layer of cellular membrane by which it is covered, as far as the space immediately above the origin of the filament specified, where the nerve is yet united in a bundle; to detach it and raise it by means of a probe; then to divide it by means of sharp scissors, removing a portion to prevent reunion. The operation being completed on one side, whether for the hypoglossal or the lingual nerve, it is performed immediately also on the opposite side, as it is of moment to destroy all the influence of the nerve over the tongue. The wound is then united by suture to keep its margins in apposition. Before dividing the hypoglossal, and while it was held raised on the probe, having pricked it with the point of the scissors, the tongue was agitated every time, and the animal appeared incapable of suffering; —an incapacity which it retained during the process of division. Conversely, when the same trials were renewed upon the lingual branch of the fifth pair, the animal gave indications of suffering the most acute pain, without any motion of the tongue appearing.

The effect which follows the division of the hypoglossal pair of nerves, is the immediate and permanent abolition of all the motions of the tongue, while tactile sensibility and taste remain unimpaired. If, indeed, the dog, which for some time may be left without food and drink, be offered a given measure of milk, he approaches the mouth to it greedily, and makes with the head and lower jaw the motions requisite to lap it up, but he does not protrude the tongue in the smallest degree, so that after many unavailing efforts, he abandons the attempt. Nor is it a matter of doubt that the milk has not been touched; because, besides that its surface is never seen ruffled, if after such experiments it be weighed, its measure is found exactly the same as at first. If there be offered to the animal a bit of bread soaked in milk or other articles, he greedily approximates his mouth, attempts to masticate, but suddenly lays it again on the ground, scarcely divided into two pieces, one of which he takes up, subdivides, and replaces anew, and so on until reduced to fragments, he abandons it. But if, in the motions he employs for mastication, bending the head, the tongue happens to escape by its *apex* from one of the angles of the mouth, that part remains hanging out flaccid, and the animal bites it and howls with pain. One dog among those subjected to these experiments was so tame that he licked the hand which approached his mouth or caressed him. After the division of the hypoglossal pair, though he performed the act of licking, he was no longer observed to protrude the tongue from the mouth, within which, if opened, that organ was seen quite immovable and flaccid, so that it lay bent in any direction.

By the division of the hypoglossal nerve not only were the voluntary motions of the tongue and those which aid mastication destroyed, but the motions which contribute to deglutition were also annihilated,—as by a simple experiment I convinced myself. A morsel of bread crumb and flesh was formed and placed on the *dorsum* of the animal's tongue. At first application it made such motions that if, on the one hand, they prove the difficulty encountered in removing the mass from the position in which it was placed, on the other, they lead to the belief that he succeeded in chewing and swallowing it; but if the mass did not move by its own weight and by the motions of the lower jaw, and thence either dropped out or hung between the tongue and teeth, it was found still in the same position after many hours. Deglutition was not completed unless when the alimentary mass was conveyed into the cavity of the *pharynx*, by the single action of the pharyngeal muscles; but even in this case it was imperfect; because, as I have often ascertained, the mass compressed by those muscles is decomposed, and returns in part into the mouth by the *isthmus faucium*, which the paralytic tongue is unable to shut.

The same result ensues, if, in order to cause the dog to drink, fluid is poured into his *fauces*; and hence it costs considerable time and patience to continue him in life. It is remarkable, that if it happened in my experiments to reverse the tongue of the animal in conveying food within the throat, he sometimes inclined and shook the head with the mouth open, in order to restore the tongue to its natural position.

I said that the animal, on the back of the tongue of which a bit of bread or flesh is placed, studies to make certain motions which express the inclination to remove the alimentary mass. I further said, that if, during these motions of mastication, the tongue happens to come between the teeth, and is bitten, the animal howls with agony. And lastly, that if this be folded back towards the throat, the animal rolling the head with the mouth open, endeavours to restore the tongue to its natural position. All these facts show that the dog both feels his own tongue, and by means of it is sensible of the contact of foreign bodies. Nevertheless, to satisfy myself more fully of the matter, I performed the following experiments. I pricked first the tongue towards the tip, when the animal gave signs of intense pain; after some time I forced into the tongue near its middle a hook to draw it without the mouth; but he howled so fearfully, and struggled so violently, that, to avoid laceration, I was obliged to remove the instrument. Lastly, I pricked the tongue towards its base, and at every puncture he gave indications of pain, while he made an effort to vomit. It is therefore evident that tactile sensibility continues after the excision of part of the hypoglossal nerve.

As to taste, I have as yet only a very obscure and uncertain test by which to judge, in the energy with which the animal acts in swallowing the flesh placed upon the tongue, because that energy may be excited either by the contact or by the smell or taste which he feels. To investigate the taste, therefore, such means were required as might operate exclusively or preferably upon that sense. and might at the same time be capable of exciting some visible and unequivocal effect upon the animal. For this purpose a saturated solution of colocynth, being void of odour, yet having a most unpleasant taste, appeared to be well adapted. Having dipt a soft hair pencil in this solution I touched gently the dorsal surface of the tongue of the dog; after which, by moving the head, reversing the tongue, and other symptoms peculiar to the expression of disgust, he readily evinced the disagreeable sensation which he experienced. Successively I placed on the tongue a bit of bread steeped in the solution of coloquintida; and immediately the same symptoms of disgust were renewed in the animal, which after many efforts to open the mouth, and shake the muzzle, succeeded finally in making it drop out. From this there could be no doubt that the specific sensation is not retained, notwithstanding the division of the hypoglossal pair.

These experiments I have several times repeated both in dogs and in sheep; and the results were always the same. In sheep also the loss of the motion of the tongue produced by division of the hypoglossal nerves is demonstrated by a particular proof; which is the inability to which the animal is reduced of drawing within the mouth the twigs, leaves, and herbs, which he takes between the lips and teeth for mastication. Farther, a circumstance which I remarked in sheep after the same mutilation, is the hoarse and feebler tone with which they bleat.

If, however, division of the hypoglossal nerves abolishes immediately and permanently all the voluntary and instinctive motions of the tongue, there is no doubt that this nerve does not preside over these motions as their efficient cause. If conversely, no lesion is produced, or it does not extinguish either tactile sensibility of the tongue, or taste, there is no doubt that these properties do not depend exclusively or simultaneously on other influences.

The effect which immediately follows division of the two lingual nerves is, on the contrary, complete extinction of tactile sensibility of the tongue with remaining motion and taste. It is, indeed, not uncommon for the dog scarcely liberated after the operation, to lick the mouth or paws, especially if they are besmeared with blood. But if milk, bread, or meat be offered, he eats and drinks freely, though sometimes in my experiments it appeared to me that the lapping was less speedy than formerly, and the mastication slower,—a circumstance which might proceed equally from the lost tactile sensibility, or from the large deep wound made in the operation. If, on the other hand, to the milk be added some coloquintida, or infusion of quassia, which gives it a bitter taste without changing its colour, and if in this milk be dipped a bit of bread, or if there be dropped some drops of the bitter solution between the pores of a bit of meat, the animal then, whatever voracity he evinces, whatever thirst may consume him, has scarcely touched the milk with the tongue, snatching a mouthful, when he suddenly rejects the one and throws down the other, with all the marks of unequivocal disgust. Nor does it avail amidst various morsels of fresh meat or soft bone, to confound one which tastes bitter, or to conceal the colocynth in the centre of a bit of bone, because the dog lighting on the bitter morsel, immediately throws it on the ground;—and if, through voracity he swallows it without mastication, he is attacked with such efforts to vomit, that he rejects the mouthful from the gullet, and being thus rendered distrustful, he refuses to eat more.

3. These facts, however, are still insufficient to prove that taste resides in the tongue; since that organ is not alone endowed with this faculty, and since the other parts of the mouth to which that sense is extended, might be those which receive the impression of savours in the dog, in which the two lingual nerves are divided. To dissipate, therefore, this source of doubt, it is proper to cause the sapid body to touch only the tongue; and then if the animal should still present indications of feeling the impressions of sapid bodies, no doubt can remain that this has not been derived from the tongue. For such a purpose it is sufficient, holding as usual the dog's mouth open, to run slightly over the dorsal surface of the tongue with a pencil scarcely dipped in the solution of colocynth. I say *scarcely*, because the fluid ought not to be carried beyond the limits touched by the pencil; and, indeed, unequivocal proofs of disgust are evinced

by the animal. The division of the pair of lingual nerves, therefore, abolishes neither the motions of the tongue, nor the peculiar sensation principally resident in that organ.

Tactile sensibility is that which vanishes by the said operation; a circumstance which is scarcely proved by the indifference and the impassibility with which the animal endures the most severe injuries offered to the tongue, for instance punctured wounds, pressure, cauterization, deep incisions, lacerations, and partial mutilation of the organ. I said that, excepting some hesitation externally, which sometimes I thought I observed, the animal used freely the tongue in lapping and masticating. The want of taste, indeed, seems to be an impediment to the free co-ordination of these motions; because, I repeat, a part which is not felt, and which does not feel, cannot be freely influenced by the will. But is it not probable that the specific sense of taste by sapid bodies, supplies the defect of tact? In this case it cannot be wonderful, that the loss of tactile sensibility by the tongue should induce all those effects which in other parts it produces.

If, then, by division of both lingual branches of the fifth pair, tactile sensibility of the tongue is extinguished, it must be inferred that these nerves preside over that species of sensibility which corresponds to the office of the fifth pair in other parts of the face. If, on the other hand, motion and taste are continued, these properties of the tongue cannot depend on the same nerves, or at least do not primarily and solely depend on these nerves. Further, if by the division of the two lingual nerves, at the same time with tactile sensibility, motion and taste are also destroyed; it would not yet be a proof that these nerves preside over these properties, but merely that the integrity of tact is a condition necessary to their manifestation. I have demonstrated from what nerve really proceeds every motion of the tongue. I shall now show whence proceeds taste.

I repeated several times these experiments upon the hypoglossal nerve, and upon the lingual of the fifth pair; and the results were always identical. They were nevertheless insufficient to exclude entirely the doubt that these nerves were foreign to the specific sensation of the tongue, and there still remained some support to the opinion of those who admit that to be the result of the simultaneous concurrence of both nerves. It became therefore necessary to divide them at once in the same animal; and though, in truth, the pretended concurrence might be removed by the division of both nerves, I was unwilling to omit this proof, which was in other respects easily obtained in the manner above indicated.

To avoid repetition in points on which I have been already perhaps too prolix, I confine myself to the statement, and this you already imagine,—that the dog in which both pairs of hypoglossal and lingual nerves were divided, was absolutely deprived of the motion, and the tactile sensibility of the tongue, and that taste was nevertheless unimpaired; because in whatever point the tongue was touched with the coloquintida solution, he uniformly expressed disgust by the specified signs, which were more manifest and enduring, if the tongue were touched towards the base. If, however, taste continue after division of both nerves, the hypoglossal and the lingual, it is not to be regarded as the result of the simultaneous action of the same nerves. It belongs then to the only nerve of the tongue which is left untouched: since the other properties of the tongue which do not depend on it, were successively and simultaneously annihilated by the successive or simultaneous division of the other nerves.

4. However conclusive this inference may be, nevertheless, since it was possible that it might not be suited to the strict logic of every physiologist, I therefore wished to procure the direct proof of the matter by dividing the glosso-pharyngeal pair of nerves;—an operation more delicate than difficult, and, like the others, causing no injury to the life of the animal which undergoes it. For this experiment also I selected the dog, and I proceeded in the following manner, after assuring myself that the animal possessed the sense of taste.

The animal being arranged conformably, and the incision of the skin being made along the median line from the thyroid cartilage to the chin, or a little farther, the skin is detached at the side from the subjacent cutaneous muscle, in the tract of the inner margin of the *depressor* of the lower jaw, and opposite to the same angle, the margins are at the same time reversed to the lymphatic glands seen there, and thus is exposed between the depressor muscle of the lower jaw and the hyoid bone the space, in the bottom of which, occupied by much cellular membrane and many veins, is found the glosso-pharyngeal nerve, as it emerges from the cranium. This cellular tissue is divided gradually, avoiding as much as possible the veins, in order to prevent troublesome hemorrhage. One of these pretty large is either tied, and then divided, or it is detached from the cellular tissue, by which it is tied to the neighbouring parts to put it out of the way,—drawing it backwards and inwards. Then appear the twelfth nerve and the lingual artery. The cellular texture before them and at the outside, that is between them and the inner surface of the depressor of the lower jaw, is separated; a few fibres of the *constrictor pharyngis* are then scraped away, and the glosso-pharyngeal nerve is exposed. This nerve is isolated by means of a hook and forceps, and it is divided as closely as possible to its emergence from the cranium, in order to exclude all the filaments. It is advantageous that an assistant, during the exposition of the nerve, should retain asunder from each other, the margins of the wound by means of hooks, and should keep the bottom of the wound free from blood. If before dividing the nerve, it be pinched or punctured by the forceps, neither does the animal give sign of uneasiness nor is the tongue convulsed. So far as to the process of division.

The effect which follows is the loss of taste with persistence of motion, and the tactile sensibility of the tongue. Of this circumstance I have assured myself by means of those proofs variously multiplied, which already proved the function of the other nerves, and which, for brevity sake, and to avoid tediousness, I omit repeating. Let this suffice for all; that the dog, in which the glosso-pharyngeal pair was divided, having recovered from the state of depression in which he was immediately after the operation, lapped water, and eat as freely as if he had suffered no injury, and that afterwards mastication and deglutition were perfect. But he had no other guide than smell in the choice of his food, so that he swallowed with the same readiness the most disgusting, and the most noxious, and the most agreeable and beneficial articles, provided either they did not smell, or their odour was artificially disguised or blended with another agreeable to the animal. In my experiments the dog eat with equal avidity, fresh animal food, or that sprinkled with coloquintida, and drank milk or pure water as willingly as that rendered bitter by the same substance. Thus having offered him a morsel of animal flesh pounded minutely in solution of coloquintida, he not only swallowed it, but even licked the rest of the fluid which was left in the vessel. At the same time I experimented upon another dog in which I had cut off the two lingual nerves. After some morsels of pure animal flesh which I threw him, he swallowed with avidity also an embittered portion; but it was scarcely in the gullet when he was attacked with vomiting, and obliged to disgorge it; and by a singular counter-apposition the dog in which the glosso-pharyngeal pair was cut, eat it immediately. The latter animal still retained the tactile sensibility of the tongue; since scarcely was it touched by a needle when he howled with pain and tried to run off.

Meanwhile, if division of the glosso-phyaryngeal pair induces loss of taste, it is undoubted that this sense depends on that nerve, which is therefore entitled to the name of *gustatory nerve*; and if the operation causes lesion neither to the motions nor to the tactile sensibility of the tongue, it is equally undoubted that these properties must be independent of that nerve. It is seen, indeed, that the glosso-pharyngeal nerve, examined diligently, both in man and in other animals, as the dog, on which my experiments have been made, without giving any filament to the muscles among which it passes, is wholly distributed to the mucous membrane of the tongue, and the other parts which have the sense of taste common with the tongue; and this sense is most exquisite where the filaments of the same nerve are most abundant, viz. towards the base of the tongue. Ascribing in this manner to the glosso-pharyngeal nerve the gustatory faculty, I think that many phenomena of intimate sympathy or consent, which take place between the tongue and the stomach, may now be more easily and directly explained, than was done by ascribing that faculty to the lingual branch of the fifth pair. By these experiments of mine upon the tongue it is finally demonstrated, if I am not mistaken, that every one of its nerves belonging to the cerebro-spinal sphere presides exclusively over one of its properties, which in their turn aid each other in producing a wonderful variety of effects. So true is it that nature, though complex and varied in her operations, is very simple in her means.

I must not omit to observe that, after killing the animal, I always found, that in the cases to which I have referred in this letter, the division of the nerves had been accurately performed. Farther, that when life was scarcely extinct, having exposed the same nerves, and pinched the hypoglossal with the forceps, I witnessed the tongue move; but when the lingual and the glosso-pharyngeal were pinched the tongue remained immovable.

IV.—*Experiments on the Spinal Nerves.*

Lastly, it only remains for me to acquaint you with the experiments which I performed on frogs and on goats in order to satisfy myself as to the properties of the spinal nerves. Among the MAMMALIA, I selected goats as animals which, to high cutaneous sensibility, unite a very extraordinary degree of energy in the muscles of the extremities.

Desiring in the frog to expose the roots of the three last spinal nerves distributed to the lower extremities, it is proper to arrange the animal upon a slender staff, of an inch and a-half broad, and five or six inches long, so that it is embraced by the four extremities of the animal, and to secure it thus stretched by a ribbon, two ends of which are first turned round the staff and over the anterior extremities of the frog, and then being crossed above, and brought over the posterior extremities, are then turned once or twice round them and tied. The frog being fixed in this manner, the integuments are divided along the median line of the back, from the base of the coccyx to the fourth last *vertebra*, and then removed partly the whole length of the first incision. Thus are exposed the vertebral muscles, which are quickly raised on both sides by scissors and forceps from the coccyx, before leaving exposed the annular portions of the four last *vertebrae*. The operator then with the thumb and fore-finger of the left hand, resting on the apex of the transverse processes of the *vertebrae*, holds the vertebral column steadily, and with a pair of small strong-pointed scissors in the right hand, makes a passage between the annular portion of the third and fourth *vertebrae*, until, having introduced cautiously one point into the spinal cavity, with the same scissor in a horizontal line, to avoid injuring the spinal marrow, he divides the annular portion of the third *vertebra;* and thus gradually in the right and left alternately he removes the annular portions of the three last *vertebrae.*

In this mode of operation the vertebral veins are unavoidably injured, and cause considerable hemorrhage, which impedes the success of the operation, or may even prove fatal. To counteract this inconvenience, it is requisite to touch the part with a fine dry feather, which, better than any other means, keeps the bottom of the wound dry, and tends to staunch the bleeding. On the right and on the left side appear three nervous threads superficial and contiguous to each other, so that they may be easily raised by a fine needle slightly bent, and cut by the scissors. These threads are the superior or posterior roots of the three last spinal nerves.

When the object is, on the contrary, to experiment upon the inferior or anterior roots of these nerves, then an assistant with the thumb and fore-finger of the left hand resting on the *apices* of the transverse processes of the *vertebræ*, holds fixed the vertebral column, while with a fine needle slightly bent in the right hand, he raises delicately and carries inwardly towards the median line the superior roots; and the operator with another needle, also bent, introduced beneath the exposed roots, takes one, two, or all the three inferior roots, and dragging them out, divides them by the scissors. But if, by the continued outpouring of blood, it is impossible to perceive the inferior roots, it will be sufficient to pass lightly with the point of the needle turned outwards upon the lower wall of the opened spinal cavity, to hook them, raise them, and then divide them.

By this method, I have very often repeated these experiments, and the results were always the following. 1*st*, The division of the superior roots of the nerves of a posterior extremity is immediately followed by loss of sensation in that extremity, while the motion is retained, the contraction of the flexor and extensor muscles persevering, so that the frog leaps as before. 2*d*, On the contrary, upon the division of the inferior roots, complete loss of motion, with persistence of sensation, ensues; the limb is perfectly paralytic, nor is there any trace of flexion or of extension, so that when the spinal marrow is pinched, the limb of the side remains immovable and flaccid, while the other posterior extremity in which the nerves are uninjured moves freely. Further, an important observation resulting from the assemblage of the experiments is, that if an inferior root of the three last spinal nerves be cut, the motions of the corresponding extremity are as prompt as if the motiferous nervous system of the part had not been impaired. Nor does any other result ensue if the two roots be divided, excepting that sometimes for a moment the motions are not so energetic as at first; but they are speedily recovered, and the frog springs as if it had suffered no injury. Yet, by this operation, more than two-thirds of the nervous matter which presides over the motion of the extremity is destroyed, there remaining only a single filament; and if this be divided, all motion immediately ceases in that extremity.

This phenomenon cannot, in my opinion, be otherwise explained than by admitting, that the innervation determining the motion of a member is equally affected by the life of several nerves, as by that of a single twig which maintains the relation between the same member and the part of the spinal chord assigned to it; unless that nerve require the lapse of a certain interval in order to concentrate within itself that efficacy which was previously distributed to many. Whence, unless I conjecture erroneously, appears the utility of the nervous plexuses, which, by the intermixture which they produce of the filaments of different roots having a common function, establish among them, so to speak, such concentric force, that each is adequate to preserve the integrity of the same function, when, by means of any lesion, the continuity of the other filaments is interrupted.

I repeated in many goats of from one to three months the experiments directed to ascertain the functions of the roots of the spinal nerves. These I performed in such a manner as to cause the animal as little suffering as possible; and I was therefore unwilling to secure the extremities by ligatures, in the apprehension that the restraint might affect the muscles and the skin, and thereby the motions and cutaneous sensibility. The method which appeared to me most convenient was the following.

The animal being mounted astride a wooden horse of convenient height, previously covered with several folds of cloth, two assistants, one on the right, the other on the left, held him firmly by the legs, a third held him by the head, and a fourth aided the operator. The hair being removed from the lumbar and sacral region, and the skin divided transversely, there was made along the median line an incision, about a palm long, from the fourth lumbar *vertebra* to the root of the tail. The skin being then detached sufficiently to expose the fleshy mass of the vertebral fossa at the loins and *sacrum*, a longitudinal incision was made, sweeping the spinous processes and penetrating to the bottom of the groove on each side, and by this incision the fleshy mass was detached from the processes. Then by a transverse incision the mass was raised and gradually separated from the bones by several transverse cuts, so as to leave exposed the annular portion of the four last lumbar *vertebræ* and of the *sacrum*. The hemorrhage proceeding from the detached muscles requires to be immediately staunched, which is effected either by the application of cold water, or by wiping and rubbing the part by means of dry towels, or by pressure made by the fingers for some moments on those parts from which the flow of blood is most profuse. Afterwards, by means of pliers, the cutting branches of which embrace in the long direction of the instrument, and when closed have the form of a sharp spoon, the spinous processes of these *vertebræ* were cut off. Then with the points of the same pliers, the annular portion of the penultimate *vertebra* was grasped, where the intervertebral spaces allow them to enter, and was cut through;—an operation which is repeated on the other side of the same annular portion at a certain distance from the first, so that on removing the portion of bone included by the two incisions, an aperture of sufficient dimensions to admit the extremity of one of the limbs of the pliers was formed. By this aperture was introduced delicately, beneath the annular portion of the *vertebræ*, one limb of the pliers; and thus successively were divided all in the vicinity of the transverse processes on both sides without peril of injuring the marrow or its investments. The annular portions, not only of the four last lumbar *vertebræ*, but of those of the three first sacral portions were divided, without, however, affecting the brim of the *pelvis*, that is, the iliac tuberosities. In dividing the annular portions, it is proper to be cautious in carrying the cutting instrument deep to the contact of the transverse processes, on that side only on which it is intended to operate on the root of the nerves, preserving a small portion on the opposite side;—a precaution which is of great avail with the view of accelerating and facilitating the operation, to avoid injury of the spinal marrow, and to obviate partly the hemorrhage which is inevitably encountered in dividing the annular portion of the *vertebræ* near their base.

The vertebral and sacral cavity being thus exposed for the tract specified, the operator raises by the forceps the lax adipose tissue covering the *dura mater;* and in this membrane makes by the lancet an opening, whence issues a certain quantity of serum, which is always present, and is most abundant the younger the animal. By this aperture is introduced horizontally a probe slightly bent with the point turned upwards; and behind this is introduced a pair of scissors with blunt points, and the membrane is cut in its long direction through the whole tract, exposed not exactly along the median line, but rather towards the opposite side to that of the roots which are intended for experiment, so that on the side of these roots there is left a larger margin of *dura mater*, and that it may hence be more easily held to be raised, and to show better the same roots at their passage by the holes of the same membrane. Then an assistant with proper forceps reverses the edge of the *dura mater*, draws it out gently, and thus renders more manifest the upper roots of the nerves, which are then successively divided by means of delicate crane's bill scissors with blunt points. For such purpose, one of the blades is passed horizontally beneath the bundle of the roots specified, until the point appear on the other side, and then the scissors raised gently to observe that no filament escapes, the division is completed by a single sweep.

When it is wished, on the other hand, to experiment on the inferior roots of the same nerves, it is proper to draw a little upwards and outwards the margin of the *dura mater*, to cut the *ligamentum denticulatum* between the one nerve and the other, in order to detach it more completely from the spinal marrow, and to see better in that space what separates the bundles of the superior roots from those of the inferior; then with a slender probe insinuated between the one and the other bundles, to raise cautiously each of the upper roots, and with the crane's bill blunt-pointed scissors, and in the manner described for the division, to divide successively all the lower roots. This part of the operation requires the greatest delicacy, and above all, the precaution of fixing well the vertebral column, to prevent all motion, which might either wound the spinal marrow, or lacerate the fibres of the roots of the nerves, or cut those which it was wished to preserve entire. It is further important to be aware that, in dividing the roots of the nerves, not unfrequently there ensues a slight hemorrhage, depending on the division of some vessels which pass between the same roots, and which it is sufficient to touch with small portions of very fine spunge, to cleanse the part from the blood, and to stem the effusion of blood.

In my experiments I never failed to investigate the state to which sensation and motion in the posterior extremities of the animal were reduced, when I had scarcely completed opening the vertebral cavity. Although every anxiety was employed in operating, and precaution was observed to avoid compressing or injuring the spinal chord and the nerves, the animal, however, always suffered from it such injury, that when put on the ground, though he walked, he showed that he had lost in the posterior extremities that energy and firmness of motion which he formerly enjoyed; but, on the other hand, I could observe no change in sensibility. In this state, no difference was presented after having opened the *dura mater*.

The nerves which in such experiments I divided were those of a single posterior extremity, that is to say, the four last lumbar and the three first sacral; though in truth the anterior crural plexus, the obturator nerve, and the posterior crural plexus, are formed solely from the two last lumbar and the three first sacral nerves. But of the last four lumbar nerves, the two first, if they do not exactly go to the muscles of the thigh, give filaments to the psoas muscle, and to the crural arch, whence they at length reach the skin, so that it is, in my opinion, a necessary condition to the issue of the experiment, to divide also these two nerves.

The operation being completed, the integuments are united by two or three points of suture to defend the spinal chord and the nerves from the direct action of the air. The animal being then placed on the ground, if the upper roots of the nerves of one of the posterior extremities were divided, it moved away, performing all those motions which it did before division; though the same posterior extremities, and especially that of the side corresponding to the divided roots, seem less amenable to the will, and are indeed less steady than the anterior extremities. The limb in which the superior roots of the nerves are divided, shows itself more tardy and slow in motion, and yields more easily than the other to the weight of the body. It happens even sometimes, that in walking, the foot of the same limb is reversed backwards, resting with the *dorsum* on the pavement. If the animal be steady, he supports himself very well on the four extremities; but if in the act of steadying himself, he had reverted the foot, he moves ofttimes the extremity; not, I believe, because he feels the posture of the foot defective, but because he perceives the defect of support by his own body. The limb, indeed, is so destitute of sensation, that if it be pricked, the animal neither moves nor shows any sign of pain; but if, on the other hand, the other posterior extremity, or any other part of the body be secretly punctured, he takes precipitately to flight, using the limb, the nerves of which were injured, but neither with the energy or the expedition which he wishes. If in this precipitate motion he happen to fall, he rises with sufficient promptitude, and uses still manifestly the same posterior extremity. The motions meanwhile continue gradually diminishing in energy, the longer the time from the performance of the operation; and at one hour after, the goat totters so much, that he readily falls on the injured limb. If he be yet pricked along this limb, he neither starts nor gives any sign of pain, while upon a slight puncture of the opposite side, he moans, is agitated, and endeavours to get up and flee, in which attempts, we recognize equally the motions of flexion and extension, even in the extremity,—the nerves of which the superior roots were divided. When scarcely raised, on taking the first steps, he seems immediately to drag the leg rendered immovable; but very soon it is perceived that the inability to bend it like the other to complete the step, depends on the foot being reverted backwards, so that the animal pressing it on the ground finds an obstacle to its flexion.

This circumstance is an additional proof that the sensibility in that foot is altogether abolished; because the animal not being sensible of the part of the foot which rests on the ground, is unable to rectify the deviation. The efforts which he makes with that limb to enable him to run are nevertheless most manifest; but the impaired vigour badly accords with the inclination, the influence of which seems already much impaired, if indeed, as I said, it be not altogether gone, from one part which is no longer felt, and which no longer feels the contact of foreign bodies; since the animal succeeds with difficulty in raising the limb entirely, and completing with it a movement of flexion. On this succeeds extension; then another motion of flexion and extension; so that there is no doubt that the motion is continued, when sensation is entirely extinguished.

But further, in order to obtain a more conclusive proof, in my experiments I wounded deeply to the bone the thigh of the animal, without its giving any sign of pain, while scarcely had I touched for counter-proof the opposite thigh, when he was thrown into the greatest agitation. Persuaded, however, that the division of the superior roots of the nerves distributed to the posterior extremity, caused loss of sensation, not of motion, either of flexion or extension in the same limb, and that any diminution in the energy and steadiness of the motions observed in this form of experiment, proceeds partly from the debility which must result from the operation, and from the contact of blood and air upon the spinal marrow and the inferior roots of the same nerves, and partly from the shock ensuing on the disunion of motion from sensation, and which are intimately associated by the unity of the system on which both depend;—persuaded of these truths I caused the animal to be put to death; and during the dying agony this gave me an opportunity of confirming them by a new proof in the motion of the four feet, which was so indiscriminate that an ignorant person might with difficulty have distinguished, in which of them the nerves were left untouched. Anatomical examination of the part always showed that all the superior roots of the nerves specified had been divided, while the lower ones had been left uninjured.

With regard to the effects which succeed the division of the inferior roots, the following is a short account of the results of experiments on goats. In the division of the inferior roots of the four last lumbar nerves, and of the three first sacral nerves of one of the posterior extremities, the animal gave evidently less sign of pain than in the division of the superior roots;—a circumstance which accords with what takes place in the spinal marrow, the upper or posterior surface of which is most sensible to the contact of any foreign body, so that the animal suffers very much from it. When the inferior roots are divided, if the animal be laid on the ground, he falls on the member; and if he be pricked by a bistoury in the same limb, he is thrown into agitation to rise, without being able to succeed. If he be raised from the ground and placed straight on his feet, and if the injured limb be punctured anew, he gives signs of extreme sensibility, and proceeds to walk, but after a few steps, falls back on the same limb. In the few steps made he drags that limb with the foot reversed backwards, without ever giving a sign of the smallest contraction in any of his muscles. Raised again, and pricked in the posterior extremity, the nerves of which are untouched, he moves yet a few steps, as he did a little previously; and, if in the act of moving, the foot of which the nerves are injured, be raised with one hand, and it is always dragged, as I have already said, it is felt utterly pendulous and powerless; and if it be carefully examined over its whole surface, it is found equally flaccid in all points, nor does it give any mark of contraction in the muscles, so that if left to go, it drops on the ground like a dead part. The animal being either supported on the feet, or lying down at length, no obstacle is encountered in moving in any direction the injured limb, provided the motion be within the limits assigned by its articulation; but, however slightly it be punctured, it suddenly offers symptoms of pain by agitating the other members, while the leg pricked remains immovable.

After these trials made in the presence of several students, the animal was left in a state of quiet for the space of one hour, the edges of the wound being previously united by four points of suture. After this interval of rest, the goat, which I select among many as the type of the present narrative, appeared to have acquired sufficient muscular energy; when, indeed, scarcely touched by the point of a knife on the limb, the inferior roots of the nerves of which were divided, he started suddenly, rose from the ground without great effort, and began to walk a long space. I did not, however, observe any motion in the same limb, which he dragged as before flaccid, with the foot reversed backwards. Upon drawing near to that which I had pricked, he sought to withdraw it; but after a few paces he stopped. Then, without his being aware, he was pricked again in the foot rendered paralytic; and he soon began to walk, and continued making different turns round the apartment, in order to avoid any one that approached him, always dragging the flaccid powerless limb. This mode of dragging the limb with the foot reversed, is a proof of the abolition of the motions of flexion in that limb. But is not its flaccidity itself a proof of the absolute and complete annihilation of all muscular contraction, and thence also of the motions of extension? Having, indeed, as I said, examined carefully the whole surface of the foot, at that very moment at which the animal was excited to motion by the punctures, I never could perceive or recognize traces of contraction in any point. Besides that, it was seen, that, immediately after the operation, the animal being laid down at length, and so exhausted and unable to rise, if he were pricked in the paralytic limb or in any other part of the body, he was agitated; but that amidst the agitation of the other members, and amidst the pains which he sometimes expressed by bleatings, the limb itself continued immoveable whatever position was given it. It was even seen, as in the act of the animal moving to walk, its foot being supported with one hand, there was never observed in it any effort, or any motion of extension, and that when left it fell like a lifeless part. Now, the last experiment was successively and several times repeated with the same result; nor this alone, but the limb was disposed in the manner in which the animal had done to complete a step, that is to say, that it was placed before the other with the sole of the foot resting on the ground; then the animal was excited to motion, and that limb was seen always equally flaccid, reverted backwards without the slightest appearance of muscular contraction in any point, and then dragged along like a heavy foreign weight. And, in short, the animal moved along slowly, and did not run, as was his desire, to escape from any one who put him to pain.

If therefore it be true, as in my opinion it is undoubted, that in the posterior extremity in which the inferior roots of the nerves have been divided, every motion either of flexion or of extension or otherwise, is completely abolished, it follows as a necessary consequence, that the muscular motions of those parts to which the spinal nerves are distributed, are regulated solely by the inferior or anterior roots of the same nerves. If, on the other hand, sensation continues there as in other parts, because the lesions are as vividly and rapidly felt there as elsewhere, it must be inferred, that the roots left untouched preside over sensation; —a circumstance which was directly proved in the preceding experiments. About three hours after the operation, the animal was put to death; and during the mortal agony, there was an opportunity of confirming the observations already made; because while the blood was flowing from the wound made in the neck, though he struggled with the two fore legs and with the hind one that was uninjured, that limb, on the contrary, in which the inferior roots were divided, remained quite immovable. Upon inspection after death, all the superior roots were found uninjured; and the inferior roots of the four last lumbar nerves, and the three first sacral nerves of the same member were accurately divided.

From these experiments on the roots of the spinal nerves, results a fact deserving of every consideration. This is that, after the abolition of motion, sensation appears to be quite unaffected; whereas the abolition of sensation is followed by a manifest diminution of muscular energy in the limb rendered insensible; so that sensation appears to depend less on motion than motion on sensation. Sensation and motion, indeed, are properties quite distinct both in nature, in origin, and in seat. But as the act of feeling is independent of the will, and to that, on the contrary, regular motion is fully subordinate,—it is evident that the influence of the will upon the action of the muscles of a part which is void of sensation, is rendered unsteady and feeble, if it be not entirely destroyed by two causes. These are, *first*, because that part no longer receives the impressions which apprise the sensorium of the relations which exist between the system and external objects, and *secondly*, because the sensorium no longer takes cognizance of the mode of existence of that part; in short, as I have said, because this part no longer feels, and is no longer felt. The goat, indeed, which does not feel the contact of the ground or its own member, can no longer judge of the attitude of the latter, and though he still retains the faculty of motion, he is no longer in a condition to move it, as otherwise he would do, with that energy, promptitude, and regularity which is required to continue a course of running, or to leap.

If, notwithstanding the loss of sensibility of the member, he be still fit to co-ordinate the action of his muscles to any regular motion, this, in my opinion, is entirely to be ascribed to the motion of that member being combined with that of the other members, and in a manner subordinate to that. But if all the members were at once deprived of their sensibility, we should see perhaps the co-ordination of their motions abolished.

Another circumstance concurs, in my opinion, to explain the diminution of the muscular energy which succeeds the extinction of tactile sensibility,—a circumstance which assigns the reason principally for the sudden unsteadiness which the animal presents in the first motions of the limb deprived of sensation, as soon as he is at liberty after the operation, though his moving at that moment be an act purely instinctive. This is, that the tactile sensibility is diffused as much at the surface of the members as in the internal parts, and especially in the muscles, in contradistinction to the other property dependent on the inferior roots of the spinal nerves, which is restricted to the muscles alone; whence it is that the nervous mass of the sensiferous roots exceeds that of the motiferous roots, and, according to approximative calculations, is to that as the number 4 to the number 3. Sensation, then, participates somewhat in the integrity of the muscles; but motion has no participation in that of the cutaneous surface. Hence is seen how the muscle participates instantaneously in the effects resulting from the division of the superior roots; and the sensibility of the skin is, on the contrary, unaffected by those which proceed from the division of the inferior roots.

In these experiments on goats I have had occasion to confirm what I had previously observed in frogs, viz. that before the complete extinction of motion consequent on the division of the inferior roots of the spinal nerves, its gradual diminution is not proportioned to the mass of the filaments which are divided. Thus, for example, if the inferior roots of the four last lumbar nerves be divided, which in totality equal those of the three first sacral nerves, and if still the lower of the first sacral nerves be divided, though in this last case the nervous mass, which presides over the contractile action of the extremity be already destroyed or interrupted by two-thirds, nevertheless this action, so far as it is permitted to judge, is not enfeebled in the same proportion. This fact, as I have already said, explains the reason of the ordination of the nervous plexuses. A remarkable difference, however, is seen in the effects of a partial division of the inferior roots of the spinal nerves, between the frog and the goat; and it is that the lesion of motion with like lesion of the nervous mass, is less considerable in the former animal than in the latter; and from this results a new proof to be added to so many others, that the reciprocal dependence of parts of the organism is greater, and therefore their integrity more important, in proportion as the class to which the animal belongs, is more elevated.

Pavia, 14*th July* 1835.

It is requisite to mention that, in the foregoing experiments, the terms *superior* and *inferior* are applied by Professor Panizza to designate respectively the *posterior* and *anterior* roots of the Spinal Nerves of the human body.

Art. VIII.—*Notice of some Experiments on the Vital Properties of Arteries leading to inflamed parts, and on the immediate cause of Death by Asphyxia.* [Read to the Medical Section of the British Association at Dublin, 13th August 1835.] By W. P. Alison, M. D., Professor of the Institutes of Medicine in the University of Edinburgh.

Heriot Row, 23d November 1835.

Dear Sir,—In several recent numbers of Medical Journals, I have seen accounts of the short paper which I read to the Medical Section of the British Association, at Dublin; and in all these there were inaccuracies seriously affecting the meaning. This makes me anxious to lay before the public an accurate account of the statements which it contained; and I therefore send you the paper itself, with a request that you will publish it in the next number of the Edinburgh Medical and Surgical Journal, and at the same time make this apology for its appearing sooner than the Report of the Proceedings of the Association.—I am, Dear Sir, Your's very faithfully,

W. P. Alison.

For some time past I have been endeavouring to form an estimate of the degree of evidence which may be adduced in favour of the physiological principle, to which some of the German physiologists give the name of *spontaneity of movement* in the fluids of living bodies; *i. e.* the evidence in favour of the proposition, That there exists in living bodies a principle of movement, affecting their fluids, or the fluids in contact with them, which is peculiar to their living state, but independent of the contractions of any of their living solids, and which I have elsewhere designated as consisting in Vital Attractions and Repulsions.

I consider it a matter of essential importance to medical science, to have this point fairly decided; because if such a principle of motion exist in living bodies, I think its alterations must certainly be the fundamental change in the production of the most frequent and formidable diseases. If such a principle exist, it must be in the capillary vessels of the higher animals, that it must chiefly operate; and it is generally agreed at the present day, that it is there that the most important diseases, whether general or local, originate;—the disorders of the heart, and of the larger organs of circulation, which occur in disease, being generally subsequent to, and apparently consequent upon, changes in the state of the circulation in the small capillaries, either general or local.

A great variety of evidence may, I think, be fairly stated in proof of the existence of the principle in question, although there is certainly still room for careful scrutiny of the facts that have been thought to indicate it. Two branches of the inquiry seem particularly deserving of attention. 1. Whether the phenomena of Inflammation can be explained, on the supposition that the only strictly vital powers moving the blood are the contractions of the heart and blood-vessels, and other living solids; and 2. Whether the phenomena of Respiration, and particularly the leading fact of the acceleration of the movement of the blood through the lungs, which is caused by its exposure to oxygen there, can be explained on that supposition.

It will be seen in the sequel, that I think the facts which I am about to state, simple as they may appear, (when taken in connection with others already known,) nearly sufficient to entitle us to answer both these questions in the negative.

I.—*Additional Observations on the vital properties of Arteries leading to inflamed parts.*

It may be remembered, that the uniform result of the observations on this subject which I had the honour to communicate to the Association last year* was, that the vital power of tonic contraction in arteries, to which Dr Parry gave the name of Tonicity,—which acts in all cases when a living artery is emptied of blood,—which determines the degree of contraction observed in arteries for some hours after death,—and which is the only vital power, ascertained by unequivocal experiment to exist in the arterial coats,—is found to be *diminished*, in all the vessels leading to an inflamed part, of a size admitting of actual measurement; and, taking these observations in connection with those made with the microscope on the minute vessels of inflamed parts themselves, it may be laid down as a general fact, that all the vessels concerned in any local inflammation, are in a state of *relaxation and distension*, as compared with their natural condition.

It is correctly stated in the Report of the Transactions of this Section, that a subsequent experiment was made by Dr Fletcher, Mr Dick, and myself, in a different mode, but leading to the same conclusion. That experiment was made on portions of the axillary arteries of a horse, in which inflammation had existed for three weeks in one of the fore-legs; the violence of the original inflammation, produced by an injury, had abated; but a blister had been applied three days before death, by which fresh inflammation had been excited. Bent tubes and stop-cocks were used in the manner practised by

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* See Fourth Report of British Association, p. 764.

Poisseuille to try the contractile power of the vessels.* Two portions of the axillary arteries, each eleven lines long, were successively fastened between two bent tubes, and distended with water, by the pressure of a column of mercury of about ten inches, introduced into one tube, and then allowed to react on the water distending them, so as raise the level of a column of water, in the other tube, to a degree which could be accurately measured. The result was, that the reaction of the artery of the sound limb raised its level by sixteen lines, and that of the artery of the inflamed limb raised it only by ten lines. But as this experiment was made on an animal already dead twelve hours, it might reasonably be said, that it afforded a measure of the elasticity only, not of the peculiar vital power, of the arteries examined.

In a subsequent experiment, made on the 28th July last, in which I had not only the able assistance of Mr Dick, but likewise of Dr Allen Thomson, Dr J. Reid, and Dr Spittal, a horse was bled to death, on account of a violent inflammation, attended with much pain and swelling, of eight days standing, in the knee-joint of one of his fore-legs; and portions of the two axillary and humeral arteries, precisely corresponding to one another, and about 2½ inches in length, were examined as soon as they could be taken from the body. The artery of the diseased limb, when taken out of the body, in this as in all the other cases, was decidedly the largest, measuring at the larger extremity of the portion taken, $\frac{12}{8}$ of an inch in circumference, and at the smaller $\frac{7}{8}$;—while the circumference of the artery of the sound limb at the corresponding points was $\frac{11}{8}$ and $\frac{5}{8}$ only. The trial of the strength of the arteries by their reaction on water distending them was made in two ways;—*First*, the second limb of the tube was filled up with water, and the space occupied by the quantity expelled on the contraction of the artery was measured. The artery of the sound limb was found to expel just .5 inch of water; that of the diseased limb .35 inch only. *Secondly*, what appeared to be the more accurate mode, the water was made to fill the second tube only to a given point, and the rise of its level, on the expulsion of that contained in the distended portion of artery, was accurately measured, and amounted to 1.75 inch in the case of the artery of the sound limb; and to 1.25 inch only in the case of that of the inflamed limb. The column of mercury used to effect the distension was exactly the same in all the trials.

Another observation was made with much care and accuracy, by Dr Spittal, on the relative circumference of these portions of arteries at this time, and again after a lapse of about twenty-eight hours, when the *post mortem* contractions dependent on the last exertions of their tonicity were over. The artery of the sound limb was then found to have dilated itself again from $\frac{33}{24}$, to $\frac{41}{24}$;—while the artery of the inflamed limb had dilated itself only from $\frac{36}{24}$ to $\frac{42}{24}$, at the corresponding point; so that the difference between the artery in its contracted state immediately on death, and in its dilated and perfectly dead state was $\frac{8}{24}$ or $\frac{1}{3}$ in the sound limb, and only $\frac{6}{24}$ or $\frac{1}{4}$ in the inflamed limb; and in other parts of the arteries it was obvious, that the difference of calibre between the vessel in its contracted state immediately after death, and its subsequently dilated state, (which is the measure of the last exertion of its tonic power of contraction,) was considerably less in the inflamed than in the sound limb; the vessels approaching more to equality of calibre at the second examination.

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* See Magendie's Journal de Physiologie, Tome, viii.

It appears, therefore, as the uniform result of all the modes of examination which we have been able to devise, that the arteries of inflamed parts, examined at different parts of their course, and at various period of the inflammation, and when they are pulsating apparently with unusual force, are in fact *relaxed* or *weakened* arteries; transmitting, in consequence of their weakened condition, the impulse given by the heart, with less modification than it receives in passing through the stronger arteries of sound parts; but themselves exerting a less power of contraction on the blood, than they do in the sound state.

This being ascertained, the question immediately presents itself, whether this weakened state of the vessels is an adequate cause for all the changes, as to the movement of the blood, which take place in the inflamed state, *i. e.* whether inflammation consists simply in a weakened action of vessels. I formerly mentioned one striking fact, on which I think there can be no doubt, as sufficient to indicate that this question must be answered in the negative,—viz. that two distinct and nearly opposite changes are ascertained to take place in the movement of the blood through an inflamed part,—a retarded movement in the vessels most immediately concerned, and an accelerated movement, and greatly increased transmission, in all the surrounding vessels.

I shall take the liberty of adding one or two other considerations, in confirmation of the opinion, that this diminution of the contractile power of the arteries, although the only change perceptible in their mode of action, is quite inadequate to explain the simplest and most essential phenomena of inflammation.

1. If we suppose inflammation to consist only in an altered action of vessels, and this alteration to be of the kind which these observations indicate, we make no attempt to explain the

difference between inflammation, with effusion of lymph, and simple determination or congestion of blood, where no unusual product issues from the vessels. Now this appearance of the peculiar *products* of inflammation, exuding from the vessels, is what the pathologist regards as most truly characteristic of the inflamed state; and I believe it to be certain, that in the usual effusions, consequent on healthy inflammation, the fibrin is both in much larger quantity, and shows a *greater attraction of aggregation*, than in any effusions from uninflamed vessels. Of this we have a familiar example in the case of the lungs, which we often find, not only infiltrated with effused serum, but so far condensed by congestion of blood, as to be impervious to air, and not crepitate when cut, without being so far increased in density as to sink in water; but so far as I have observed, whenever we see the granulations of decolorized lymph in the air cells, truly characteristic of inflammatory effusion, then we are certain of seeing this decisive proof of the increased density of the lungs.

2. If we suppose inflammation to consist merely in that relaxed condition of the vessels which is indicated by these observations, we must suppose the usual *causes of inflammation, e. g.* mechanical injury, to produce, very rapidly, in all the vessels adjoining and approaching to the part to which they are applied, this state of relaxation or weakness, and to be effectual in exciting inflammation, only in as much as they diminish the vital power of those vessels. Now this depressing or sedative effect on vital power is not only just the reverse of the effect produced by such agents on other living parts, whether irritable or sensible, but is just the reverse of the effect produced by such agents on arteries themselves, when they are applied in such a manner as directly and exclusively to irritate their coats; as in the experiments of Verschuir, Dr Thomson, Dr Hastings, Wedemeyer, and others, where the contractile power of arteries was decidedly excited by irritation, their calibre in consequence *lessened*, and the transmission of blood through them *impeded*.

The more that this subject is considered, the more distinctly, as I think, must it be perceived, that the only way to escape from these various difficulties is to suppose, that the causes which excite inflammation do so by really exciting or increasing a vital action, but not an action of the nature of contraction; that the idea of the vessels of inflamed parts taking on an increased action is a delusion; that what is truly excited is an action not *of the vessels* but *within the vessels* of the part affected; that it is an increased exertion of powers by which the blood is moved, or its motion influenced, in the capillaries, but which powers are inherent in the blood itself, dependent on, or influenced by, its relation to the surrounding textures, but independent of any contractions of living solids; and the increased exertion of which powers leads always to distension, and to more or less diminution of the tonic power of contraction, of the vessels, within which it takes place.

II.—*Experiments illustrating the immediate cause of Death in Asphyxia.*

The experiments on this subject which I am to relate are so simple, and their result so consonant to former observations, that in order to show them to be in any degree worthy of the attention of the Association, I must enter on a short explanation of the point which they are designed to illustrate.

I take it to be well ascertained, by the experiments of Dr Williams of Liverpool, and Dr Kay of Manchester, that in ordinary cases of Asphyxia the circulation of the blood is brought to a stand, not in consequence of the venous blood penetrating either the nervous or the muscular textures of the body, but in consequence of its gradually failing to penetrate the lungs, and not being delivered to the left side of the heart in sufficient quantity to maintain effective actions there.

It appears, therefore, that the admission of air into the lungs in respiration is, in some way or other, a powerful auxiliary cause of the circulation through these organs, and that when that auxiliary power is withdrawn, the contractions of the right side of the heart, although continuing vigorous for some time, soon become ineffectual in propelling the blood through the lungs.

The question immediately presents itself, in what manner do the actions of respiration afford this auxiliary power to the circulation through the lungs?

It may be remembered, that the doctrine of Haller on this subject, prior to the speculations either of Goodwyn or Bichat, was, that the actions of respiration are a merely mechanical auxiliary to the circulation, and that asphyxia depends simply on the blood stagnating in the lungs, in consequence of the suspension of the natural alternate contractions and expansions of their substance. After the theories both of Goodwyn and Bichat had been shown to be erroneous, it is not surprising that this idea should be revived, and stated in explanation of the death by asphyxia; as has been done in an ingenious article in the Edinburgh Medical and Surgical Journal.

The obvious method of bringing this theory to the test of experiment is to ascertain, whether the gradual stagnation of the blood in the lungs, and in the right side of the heart, takes place equally in an animal asphyxiated by breathing a gas which contains no oxygen,—where the mechanical actions of respiration go on even with increased force, although the chemical changes are suspended,—as in one where the mechanical part of the process is suppressed by hanging or drowning.

It is stated by several physiologists, and particularly by Mr Broughton, that in animals asphyxiated by breathing azote, the right side of the heart is found distended with blood, and contractile, and the left side nearly empty and motionless, as in other cases of asphyxia. But to this observation it may be objected, that the animals were allowed to lie in the azote until they became insensible, and it was only some minutes thereafter that their chests were opened; and that as the actions of respiration would necessarily become slow and imperfect, and then cease entirely (whether from the presence of venous blood or the deficiency of arterial in the brain, we need not inquire,) some time before the examination was made, the impediment to the circulation, supposed to be consequent on the suspension of the mechanical acts of respiration, would have time to show itself.

I therefore thought that, in order to decide this point satisfactorily, it would be necessary to have an animal confined in azote, not until it became insensible, but only until its respiration became laboured; and then taken out and immediately killed, in the manner most likely to arrest its circulation instantaneously, so as to give us an opportunity of judging, whether the blood in this case fails to make its way through the capillaries of the lungs, even while the mechanical actions of respiration are going on with full force.

With the assistance of my friend Dr J. Reid, I therefore performed the following experiment repeatedly.

A rabbit was confined under a bell glass in azote, until its breathing became obviously laboured, not more frequent than usual, (in fact generally less frequent, the respiration of that animal, especially when it is at all frightened, being very rapid,) but distinctly fuller, longer, and more forcible. The bell glass was then removed as quickly as possible, and the animal instantly struck on the head, with such force as to crush the brain and *medulla oblongata* completely. It never appeared to inspire after that injury, but was always strongly and generally convulsed. As soon as the convulsion was over, the chest was opened, and the state of the heart and great vessels examined. We were rather surprised to find, that, notwithstanding the extent and violence of the injury of the brain, the right side of the heart was never completely stilled, although its contractions were feeble and quivering, and obviously ineffectual for maintaining the circulation. The movement of the blood towards the right side of the heart by the great veins likewise always continued to a certain degree; but in these respects the appearances were the same as in comparative trials on animals in the natural state.

What was essentially important was the observation made in all the animals which had been confined in azote, and also in one which had been confined in a small quantity of air, until its breathing had become hurried and laboured, viz. That the right side of the heart was always found, from the time it could be brought into view, distended with blood, and the left side comparatively empty. The quantity of blood got by puncturing the pulmonary artery and pressing the right side of the heart was from five to ten times as much as could be obtained in the same way from the left side,— a difference greater than is sometimes observed in an animal that has been hanged. The right side of the heart, as already stated, was always found pulsating feebly, though not maintaining the circulation. The left side of the heart, evidently in consequence of defect of blood in it, was always found motionless; whereas in one of the observations on an animal breathing naturally, until it was killed in this way, this side was found pulsating, although feebly, for a short time.

I think it evident, from these experiments, that the explanation of the failure of the circulation in Asphyxia, by the suspension of the mechanical process of expansion and contraction of the lungs, is erroneous; that the circulation fails equally, and is obstructed at the same spot, although the movements of respiration continue, if oxygen be not inspired; and that *air*, or a gas containing oxygen, is possessed of a peculiar efficacy in promoting the flow of blood through the lungs; and the question immediately recurs on us,—In what manner does the air, admitted into contact with the blood at the lungs, promote its flow through their capillaries?

If we suppose the air to effect this purpose by acting as a stimulus to the capillaries of the lungs, we lay ourselves open to two objections which seem quite insurmountable. 1. We suppose the minutest capillaries of the lungs (certainly the vessels which are immediately exposed to the air) to be vessels capable of contraction; whereas the most careful observations on the blood moving on the sides of the air cells of the lungs leave it very doubtful whether it is there confined within vessels at all, and certainly give no countenance to the supposition, that the smallest channels or tracks in which it moves are susceptible of vital contraction *. 2. We suppose the effect of the stimulus of the air, acting on these vessels, to be the very reverse of what has been observed in every case where either this or any other stimulus has decidedly acted on a living artery; because in all such cases, and particularly in the experiments of Wedemeyer, where stimulating liquids were introduced into living arteries, and obviously caused constriction of their smaller branches, the effect was, not to promote, but to retard and impede, the transmission of their contents.

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* See Marshall Hall on the Circulation, pp. 40, 47, and Pl. viii.

If again, we suppose the effect of air on the minute arteries in the lungs to be, to cause relaxation or distension, *i. e.* to act as a sedative on them, we attribute to the air, in its action on these vessels, an effect the very reverse of that which is observed, when any other vessel is exposed to that agent; the change observed in such cases (when any change is observed) being always of the nature of tonic contraction.

The conclusion, therefore, appears to me to be nearly inevitable, that the application of air to the blood in the lungs promotes the flow of the blood there, in a manner wholly inexplicable, either by the mechanical process by which the air is applied, or by any influence which the air can exert, on the contractile power of the vessels, through which the blood moves. And if this be so, I think the reasonable inference must be, that the motion of the blood through the lungs, in a living and breathing animal, is partly determined by causes which are independent of any impulse, or modification of impulse, by the solids containing the blood.

This inference will be strongly supported, if it shall appear, on farther examination, to be the fact, as seems to me nearly ascertained, that in some of the lower classes of animals and in vegetables, the mutual action of the living fluids and of the air is provided for, by movements of fluids, but independently of any muscular contractions of solids, in the respiratory organs. And I cannot help indulging so far in conjecture as to anticipate, that the important discovery of Purkinje, of the currents visible in the air-passages of animals, will be found to support the same inference. For although these currents have been ascribed, both by the German and English physiologists who have observed them, to the vibratory motion of minute *ciliæ*, yet I am strongly inclined, from what I have myself observed of such currents in several other instances to believe, that the movement of the *ciliæ*, although frequently an accompaniment, and perhaps an auxiliary, is not an adequate cause of them; and that their real cause is more accurately expressed by the terms used by a recent French author, who ascribes them to a *jeu d'attraction et repulsion* between the living fluids and the air.

ART. IX.—*On Obstructions in the soft parts to the progress of Labour.* By J. T. INGLEBY, Lecturer on Midwifery at the Birmingham School of Medicine.

AN obstruction in the soft parts to the passage of the child through the *pelvis* may prove almost as formidable as an obstruction which arises from deformity of the bones. Labour, attended with mechanical obstruction of the soft parts comprises ;—

1*st*. The presence of the hymen.
2*d*. Tumours of the *labia pudendi*.
3*d*. Protrusion of the bladder and *rectum*, and *calculi* in the bladder and *urethra*.
4*th*. Firm contractions of the vaginal orifice and canal.
5*th*. Tumours abridging the capacity of the *vagina*.
6*th*. Tumours attached to the *uterus*.

1. *The presence of the Hymen.*—An impediment to delivery has not unfrequently arisen from the hymen being very rigid and nearly imperforate, and the only question which can be raised relative to an incision is too simple to need comment. I have seen instances of the almost imperforate hymen combined with early pregnancy; but, with a single exception, the obstruction gave way, under the daily employment of the bougie, prior to the accession of labour. Sexual intercourse must have been imperfect, not to say impracticable.

2. *Tumours of the labia pudendi.*—An encysted tumour, however large, of the *labium pudendi*, can scarcely impede parturition; but an extravasation of blood within the labial tissues, extending perhaps to the vaginal entrance, presents a surface of extraordinary dimensions. In one instance of the kind to which I was called in consultation, the amount of *coagula* which Mr Elkington extracted by a pair of dressing forceps, through a laceration at the edge of the *vagina*, nearly filled a pint basin, and a considerable quantity remained and occasioned sloughing. The extravasation happens usually during the pain which expels the child, but sometimes at an early period of labour.

It has been suggested, on very high authority, that the swelling should be punctured, provided there has been no delay, and the puncture is made whilst the blood is still liquid. On one occasion I promptly carried this suggestion into effect, but without success; and, considering the structure of the *labium*, it is probable that the greater part of the blood will coagulate almost as rapidly as it is effused. It is important to examine most accurately the inner surface of the *labium*, on account of its great liability to be lacerated when distended with effused blood. Tumours of this nature, as well as highly œdematous states of the external parts, generally from serous infiltration, can only retard for a very short time the delivery of the head. The *labia*, from their bulk, may, indeed, compel the patient to rest on her back, maintaining a pillow between the thighs to keep the swellings asunder; but if the swollen parts are punctured, and a particularly fine curved needle answers best, a load of serum is drained off, and relief is rapidly obtained. I have not observed any of the reported bad effects, sloughing and gangrene, for instance, succeed this little operation; nor are they likely to occur in an unimpaired constitution. Neither can varicose tumours of the external genitals, formidable as they appear, produce a real obstruction to the passage of the child. Two years ago, I was hastily summoned into the country to see a parturient woman, in whom the *labia*, *mons veneris*, and vaginal orifice, were so mis-shapen and swollen by varicose veins, as to lead to an apprehension that delivery would be impracticable; but no unusual difficulty took place.

3. *Protrusion of the bladder and rectum; calculi in the bladder and urethra.*—The *vagina* may be fully occupied either by the distended bladder, or the *rectum*. Obstacles to delivery, occasioned by malposition or inordinate distension of the bladder, have already been considered.[*] Obstacles, which consist of the *rectum* distended with *scybala*, and protruding into the *vagina*, occur very rarely. I have seen but one striking specimen of recto-vaginal tumour protruding through the external parts; but the *pelvis* was unusually large, and had delivery been near at hand, the space would have been sufficiently ample.

Instances are also recorded of labour being obstructed by urinary *calculi*. Some years ago I attempted the removal of a large *calculus*, which, after delivery, had ulcerated the superior part of the *urethra*, and projected considerably across the *vagina;* but the turbulence of the patient overcame the moderate restraint which was imposed upon her, and all entreaties to induce submission proved unavailing. In a case somewhat analogous to this, I assisted my friend Mr Wickenden in an attempt to extract a *calculus* through a fistulous opening in the bladder, (the result of difficult parturition many years previous;) but the mass was held too firmly by the fungoid-looking and everted edges of the *fistula*, to admit of its removal. A year afterwards the attempt was renewed, and Mr Wickenden succeeded in extracting the *calculus*, which was in size equivalent to a pullet's egg.

4. *Firm contraction of the vaginal orifice and canal.*—Con-

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[*] See Edin. Med. and Surg. Journal for 1st October 1835, page 331 and 332.

tracted states of the vaginal orifice are sometimes congenital, more frequently, however, the result of inflammation in early life. In a case of difficult labour which occurred in the practice of my friend, Mr Bury of Coventry, the *os externum* was very greatly contracted by a *cicatrix*, the product of an abscess in childhood; and the division of the part was immediately followed by delivery, though strong pains were previously exerted in vain. It would be superfluous to describe the many impediments which are found at the vaginal orifice to the delivery of the child; for whether the aperture is very small, nearly imperforate in the ordinary acceptation of the term, or closed by thick fleshy growths, membranous bands, or cohesion of surface, the treatment is both obvious and simple. I shall therefore confine my remarks to deviations of the more important kind.

Labour may be obstructed by a preternaturally long and unyielding state of the *fourchette*, united to an adjacent portion of the vaginal membrane. Thus the entrance is narrow; the space between the *fourchette* and the true *perineum* very long; and the vertex, instead of inclining gradually under the pubic arch, threatens to emerge through the centre of the *perineum*, leaving the edge entire. An instance of this accident, which I know to have happened, was very nearly occurring in my own practice. In this case the head was distending the posterior part of the *perineum* to a degree which threatened laceration. I waited in the vain expectation that it would advance towards the *pubes*, and tear the *fourchette* and portion of vaginal membrane, now greatly extended. Nothing short of an unremitting and uniform support saved the *perineum*. But presently a mass of blood was extravasated within its cellular tissue. The *fourchette* being divided with a bistoury, the head advanced towards the *pubes*, and the labour soon terminated; but the *perineum*, though entire on its external surface, presented the feel and appearance of a very large soft bag, the contents of which, consisting of fœtid black blood, continued to escape for nearly a month, producing fever, and a train of symptoms peculiar to the absorption of morbid discharges. Recovery was ultimately perfect.

The ordinary form of stricture of the *vagina* is contingent on injuries received in parturition, either from the neglect or the unskilful application of instruments, and subsequent inattention to the state of the canal. In place of the natural textures, we find a cicatrix or callosity calculated to produce a serious impediment to delivery.

When the *vagina* is contracted by thick and unyielding fibrous bands, uneasy sensations arise in the urinary organs, and more especially in the middle months of gestation, the *vagina* having then acquired its utmost amount of elongation. I have known the distress continue to the completion of the term, and cease on the division of the stricture during labour. Contractions and partial obliterations of the *vagina*, which result from local injury, are in most instances removed by the timely use of bougies, sponged tents, or other suitable dilators. It is requisite, however, to mention, that the practice of dilating very firm strictures is not quite free from risk; for in irritable habits there is some danger lest inflammation should arise and extend to the peritoneal tissue. But it is more than probable that the existence of the stricture will not be ascertained until the accession of labour. The practitioner must then wait a reasonable time for the desired relaxation of the diseased parts in common with the mucous surface in general, promoting it, if needful, by the hip-bath, fomentations, general blood-letting, and ipecacuanha in repeated doses. The effect of a full blood-letting has frequently proved most signally beneficial; and unless contra-indicated by constitutional peculiarities or complexities of the labour, should always be enforced, and if needful repeated. The cicatrix may prove to be very thin, and give way to the first impulse of the head. * Two cases of stricture are related by Smellie, and one by Merriman.† In all these the obstruction yielded to the natural powers; but Dr Merriman's patient died after sudden faintness on the second day after delivery. It is merely stated that " a very small aperture through the *vagina* was discovered close to the contracted part." ‡ In some instances the stricture is dense, but yields after many hours of protracted suffering. Very firm cicatrices, again, yield only to incision.§ The vessels at the sides of the *vagina* may be unavoidably wounded in very complicated contractions, but there can be no risk of injuring the *urethra*, bladder, or *rectum*.

Assuming the liberation of the stricture by incision to be indispensably necessary, it is important to determine at what period this can be done with the greatest advantage, whether during gestation or during labour. If the amount of contraction be such as to threaten serious difficulties, the earlier period is preferable on several accounts, but chiefly lest the child should present transversely, as in a case I have described, and the introduction of the hand *in utero* be found impracticable. The incision must not be delayed too late, but a sufficient time allowed for restoring the canal prior to the completion of the full term. If the stricture is not obviously calculated to obstruct delivery, and that most seriously, I would prefer waiting, but not neglecting to employ the bougie; since, antecedent to the relaxing influences of labour, it will not be possible to predict the necessary extent of incision, nor indeed whether any is required.

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* Smellie's Cases, Vol. ii. Coll. xxi. No. 2, Case 4, p. 373.

† Synopsis, p. 59, 4th edition.

‡ See Ryan's Journal for 30th May 1835, No. 174, for a case of occlusion of the *vagina* obstructing delivery.

For a variety of other references, see Davis's Principles and Practice of Obstetric Medicine, Part 41, p. 972, 977.

§ See Mr Norman's interesting case, Vol. xiii., Med. Chir. Trans. p. 351.

Neither would it be prudent to resort to an incision during the precursory stage of labour, lest it should prove very tedious, and the incised parts inflame, but wait for tolerably strong pains in order that the necessary extent of incision may be defined with accuracy. The importance of making the incision during a pain,—a time when the patient is scarcely conscious of it,—has been impressed by my friend Dr Rigby. I proceed to detail two cases of formidable obstruction to which I was called in consultation.

Case 1. This was a second pregnancy, and the patient's former labour, which proved very protracted, was terminated by means of the forceps. The catheter was employed some days after the delivery, but the bladder subsequently lost its power, and the urine was discharged involuntarily for six months. I have no doubt of sloughing having happened. At length the bladder recovered its power, pregnancy again took placc, and labour occurred at the full term. On examination, a strong *cicatrix* of a circular form was discovered at the upper part of the *vagina* resisting the descent of the head. Under very powerful pains the stricture at length yielded a little, and permitted an inconsiderable portion of the head to enter it. A second cicatrix, broad and rather oblique in its direction, and producing distressing tenesmus, passed from the posterior edge of the circular stricture already described to another of a very gristly nature; which surrounded the *os externum*, and barely permitted a finger to enter. The pains, powerful as they were, at length proving fruitless, Mr Blount divided rather extensively the circular strictures, applied the long forceps, and most judiciously and safely delivered his patient of a living child. Recovery was rapid and perfect.

Case 2. Mrs ——— in her first labour, was delivered by the forceps of a dead child, and the catheter employed for ten succeeding days, when she was supposed to have recovered. Pregnancy recurred in about four or five months, and after experiencing many painful sensations, especially in voiding urine, the *vagina* was examined, and found to be nearly closed. At the completion of the full term, the membranes gave way without pain during the night of Thursday, the *liquor amnii* oozing away almost imperceptibly. I met her surgeon in consultation some hours afterwards, and made an accurate examination. The *os externum* was of a perfectly circular form, and admitted only the fore-finger, which it very tightly embraced. The perineum was long and of a very gristly texture. About an inch and half above the external orifice, the finger encountered an apparently blind sac, or membrane not unlike the imperforate hymen; but after much searching a *foramen* or aperture, which allowed a probe to pass, and through which the waters were escaping, was discovered at its junction with the posterior surface of the *vagina*. We determined upon waiting for the active contraction, which ensued on Saturday morning, and having divided the false membrane during a pain, and carried the fore-finger beyond it, the arm of the child was found to have passed the *os uteri*. The *os externum* was freely incised wherever the stricture and resistance seemed greatest, selecting first one part, and then another, for division, as circumstances demanded, during the long period which was occupied in passing the orifice. A good deal of blood was necessarily lost. At length I succeeded in carrying my hand into the *vagina*, reached the foot and delivered the patient of a living child. Fortunately a little *liquor amnii* still remained *in utero*.

For about a fortnight after delivery the treatment was limited to syringing the *vagina* with tepid water, oiling the injured parts, and applying large poultices. Her judicious surgeon then substituted the bougie and sponge-tent, and under his unremitting attention, the canal was perfectly restored. The patient did not experience a single bad symptom.

Like strictures in general there is a great tendency in the diseased parts to form fresh contractions, as in the annexed example.

CASE 3. A woman had a difficult labour, and was delivered by the forceps. A stricture was formed rather nearer the *os internum* than the vaginal orifice, which, however, did not prevent pregnancy from recurring. Under strong labour-pains and the pressure of the head, the stricture gave way, and delivery was effected by the natural powers. Some time after this she complained that sexual intercourse was productive of great pain not only to herself but to her husband also. The stricture has in fact returned, and was only removed by a long-continued process of dilatation.

Whenever, therefore, a labour has been attended with great difficulty, particularly if instruments have been employed, the *vagina* should be examined at the end of the month with the view of determining its condition, and preventing these firm contractions in the canal consequent upon inflammation and sloughing.

5. *Tumours abridging the capacity of the Vagina.*—An im-

pediment to delivery arises not unfrequently from tumours connected with the *vagina*. Some of these are within and others exterior to the canal, yet producing similar effects. Let us briefly consider them in reference to their relative situation and kind, their effects, size, texture, treatment, and final result. Tumours may proceed from any part of the *pelvis*. The largest which I have yet seen occurred in a young woman, twenty-three years of age. The first symptom regarded as *sciatica* was lameness and pain in the hip. At length a tumour appeared above the *pubis*, rather inclining to one side, globular in shape, and of stony hardness. It acquired an immense size, and after severe suffering, the patient died excessively emaciated.

On examination, the diseased mass was found firmly attached to every part of the ligamentous structure of the *pelvis*. On making a section of the disease, the cut, or rather the sawn surface, presented an appearance like the undressed muscle of the cod fish, and was composed partly of bone, but chiefly of a dense homogeneous substance, the centre of which was hollow, and contained a quantity of gelatinous secretion. About a third of the mass was removed by the saw and the knife, and could not weigh less than eight pounds. Delivery *per vias naturales* would have been impracticable.

5. *Vaginal* tumours which obstruct parturition for the most part occupy three principal situations, viz.

a. Tumours within the *recto-vaginal septum*, comprising tumours formed by the ovary and covered by *peritoneum*, adipose tumours, &c. &c.

b. Tumours in connection with the proper tissues of the *vagina*, or fibrous and follicular developements.

c. Tumours situate behind the *rectum*, comprising clusters of diseased glands, adipose and encysted tumours.

Fibrous and adipose tumours have been known to produce the most serious impediments to the course of labour. Scirrhous glands seldom acquire a large size.

The principal tumours which occupy the vagina.—They are usually several in number, irregular in their shape, adherent, and without fluctuation. But the class of tumours which most frequently obstruct labour, comprise follicular enlargement and the prolapsed *ovarium*. The former disease originates in the *vagina*, and has been shown by Mr Heming to consist in a dilated state of one of the mucous follicles * which acquires a cyst, and secretes a fluid of varying colour and consistence, from a dark to a straw-coloured serum, or a deposition purely gelatinous. The density of their walls may very probably not admit of the fluid being distinguished, but perfect flaccidity usually succeeds their evacuation by puncture. Although the commencement of an ovarian enlargement may appear to be coeval with pregnancy, there can be little doubt of the disease having an antecedent existence, the slight previous enlargement increasing with conception, and the more so as pregnancy advances *. There are two forms of ovarian tumour which may obstruct the passage of the child. In the first, a small cyst in connection with a very bulky cyst, or a portion of a large cyst, passes into the recto-vaginal *septum*, and appears at the posterior part of the *vagina*. I once punctured the ovary in this situation, and drew off four gallons of jelly-like fluid. † In rare instances the bulging appears at the anterior part of the *pelvis*. In the second form, and that which occurs by far the most frequent, the whole ovary, moderately enlarged, prolapses within the *septum*. The descent is peculiarly liable to happen at two periods, namely, near the end of gestation, and also during labour—the prolapsus being promoted by the relaxation of the soft parts. The changes which the ovary undergoes when long detained in the *septum* will chiefly depend upon the capacity and yielding state of the parts. In a woman who has not previously born children it may remain small, and scarcely retard delivery; but under contrary circumstances, it acquires a large size and nearly fills the *vagina*.

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* Edin. Med. and Surg. Jour. Vol. xxxv. p. 82.

It may even happen that the *ovarium*, when moderately enlarged and confined within the abdomen, may alter the course of the gravid *uterus* in its ascent out of the *pelvis*, so that the organ can neither preserve its perpendicular direction nor freely develope itself on the side on which the tumour is situated, and thus the lateral obliquity, as described by writers, is almost necessarily produced, although this malposition of the *uterus* may fail to occasion a direct obstruction to the entrance of the presentation within the brim,—the axis of the organ, as respects the *pelvis*, being no longer maintained, the labour may be expected to prove tedious.

Diagnosis.—A tumour, situate within the *recto-vaginal septum*, movable, perhaps rather elastic, and imparting to the finger, which cannot be passed behind it, a sense of fluctuation, may be presumed to be the *ovarium*. But the ovary may be immovable, inelastic, and, so far from imparting a sense of fluctuation, may be apparently as hard as a fibrous or bony tumour.

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* See case of Malignant Ovarian Disease, proving fatal a few days after delivery. Part xv. Cyclop. of Pract. Med. p. 231. The severe symptoms began in the fourth month.

† A case of ovarian tumour, which burst during labour, and was attended by the escape of several gallons of serous fluid, is detailed by Mr Langley in No. 140, Vol. vi. of Lond. Med. and Surg. Journal of 4th October 1834, p. 319.

It furnishes almost every species of morbid secretion, together with hydatids, hair, and other heterogeneous materials, and is the only description of vaginal tumour which admits of elevation above the brim. It is also the most likely to disappear spontaneously. Besides its liability to burst under the impulse of the fœtal *cranium* in common with other encysted tumours, it has the chance of being drawn up by the changes which the *uterus* undergoes after delivery. Dropsical fluids and hernial protrusions, which enter the *septum*, and yield easily to pressure, cannot be well confounded with tumours of a more consistent character.

Effect of Pelvic Tumours.—The effect of all pelvic tumours will be proportionate to their bulk, texture, and relative situation. Thus, we find pain in the back, numbness in one or both lower extremities, and sciatic pains, difficult progression, especially on going up stairs, hemorrhoids, and obstruction to the natural discharges. The orifice of the *uterus* will most likely be found out of the axis of the pelvic brim. But the most dangerous consequences will ensue during parturition, and to these it is intended especially to refer. Having, during labour, detected the presence of a tumour within the vaginal tissues, and obtained its history, no time should be lost in determining its exact site, boundaries, mobility, size, connections, and, as far as possible, its texture and consistence.

Examination during labour.—To obtain the requisite information, an examination should be made in the absence of pain, and before the presentation has become engaged in the *pelvis*, lest the tension which the mass undergoes during strong pain should obscure the diagnosis. If the presentation be in part only below the brim, it may be difficult to determine whether the apparent firmness of the tumour is not owing to obstructed circulation. Whilst making the usual examination *per vaginam*, it may be advantageous to pass the fore-finger of the left hand into the *rectum*, with a view of ascertaining more correctly the contents of the tumour.

Treatment of labour complicated with Tumour.—Tumours which cannot be raised above the pelvic brim may bo treated by puncture, incision, or extirpation, or opened subsequently to delivery with caustic. The Cæsarean operation, and the induction of premature labour, may also be included as objects of treatment. Merriman observes, " Should the case be such as to allow the difficulty to be overcome by employing the forceps or vectis, there could be no hesitation in having recourse to either of these instruments. But if there be no chance of suceeeding with any instrument short of using the perforator, it would be right to pause and to consider whether to remove the tumour, or to diminish the size of the child, would be most likely to be attended with ultimate advantage, and so much will then depend upon the size, situation, and nature of the tumour, that it is impossible to lay down exact rules upon the subject." * This author gives a summary of eighteen cases, and such of them as were treated either by version or the crotchet, terminated most inauspiciously; others were treated by puncture with a more happy result.

Burns sanctions the puncture in all these tumours which cannot be pushed up, and prefers their extirpation to the employment of the crotchet, but puncturing is elsewhere denounced as "very dangerous and highly improper." † Dr F. H. Ramsbotham, in his comprehensive Lectures, declares the impossibility of laying down any general rule applicable to each individual case, but insists upon the principle of puncturing tumours which possess the least degree of fluctuation; though he does not seem to extend the practice to other cases. Madame Boivin, who is silent about the puncture, observes, "if the tumour cannot be pushed above the brim, the practitioner will apply the forceps, or deliver by the feet, or possibly have recourse to the *symphysis pubis*, or to the Cæsarean section." Without dwelling on the interests of the child and the feelings of the practitioner, embryotomy has too frequently proved destructive to both lives, although Professor Davis calls it "a tolerably safe measure to the mother." Dr Ramsbotham's three patients treated by embryotomy ‡ had favourable recoveries; but the greater number of women appear to have sunk under the violence necessarily employed in the delivery, which, in several instances, required from four to six hours for its accomplishment, and in one instance proved impracticable. As a primary measure, embryotomy is therefore highly improper, and has been justly condemned by Blundell. The measure may unhappily become necessary; for the puncture, efficient as it usually is, does not necessarily supersede perforation, and perforation in its turn may prove inadequate to overcome the difficulty. The practice of puncturing vaginal tumours is by no means generally acted upon, notwithstanding the many testimonies which may be adduced in its favour. A mere puncture can scarcely be more dangerous than the operation for *ascites*, or ovarian dropsy. Instead, however, of resorting to it early in the labour, it will be proper to wait a moderate time, unless, indeed, it appears evident that the measure will ultimately be required; since the tumour, though of considerable bulk, may prove sufficiently compressible to allow the head to pass. Should this happily prove to be the case, a gentle attempt might be made after delivery, according to M. Chevalier's suggestion, to raise the tumour out of the *septum* into the abdominal cavity.

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* Med. Chir. Trans. Vol. x. p. 50.

† London Practice of Midwifery, 2d edit. p. 155.

‡ Ramsbotham's Cases, Vol. i. p. 337, 341, 343.

The annexed interesting case of labour obstructed by an ovarian abscess was very obligingly communicated to me by my highly respected friend, Mr J. W. Wilton, one of the surgeons of the Gloucester Infirmary.

Case 1. " On the 31st July 1831, I visited Mrs M. early in the morning. She had been in labour some hours. On examination, I found a tumour filling the *vagina*, which seemed to grow from its upper and posterior surface. It seemed to be a solid and fleshy mass, and its magnitude gave me great apprehensions for the result of the labour. I had attended the patient in former labours, when she had always done well, and no such obstruction had ever till then been met with. The pains were violent, and the head of the child made slow progress in front of the tumour. After more violent and protracted efforts, the child was born in the evening of the same day. Immediately after delivery I examined the *vagina*; but the tumour had disappeared, and the patient got well as usual without anything occurring worthy of notice.

" May 9, 1834. Again attended Mrs M. in labour. On examining, I found the tumour as before, and I was as much at a loss as ever to ascertain its nature. The labour was accomplished with much less difficulty than on the former occasion, and again the tumour disappeared. There was some hemorrhage; but the *placenta* was expelled by pains, the *uterus* seemed to be well contracted, and the hemorrhage ceased. Her pulse was quick, and she complained of unusually severe after-pains, especially in the back. In half an hour, I was again called to her. She had now the appearance of sinking from hemorrhage; but there was no discharge. The pain in the back was agonizing; opiates failed to produce relief; the exhaustion kept increasing, and she died in about two hours.

Next day we examined the body, which had a very exsanguine appearance. The *uterus* was contracted, and without blood in its cavity, nor was there any substance in the *vagina*. A fleshy-looking tumour was seen rising from the left side of the *pelvis*, which, on being cut into, was found to contain about a pint and a-half of *pus*, mixed with a considerable quantity of hair like tow. The hair did not appear to be attached to the sides of the bag which held it, but to be loose in the cavity.

This tumour I believe to have been the left *ovarium*, and the same which, on the occasion of the two labours, had been found down in the *pelvis*, protruding the *vagina* before it, and producing the impediment to delivery. From this narrative, it appears that the ovary was in each labour forced down by the child's head, and, excepting on the occasion of the last delivery, was drawn up into the *abdomen* immediately afterwards.

Case 2. Some time ago, I was called into consultation upon a case of labour rendered very difficult by a tumour the size of a swan egg, extremely firm, spherical, and situated over the sacral promontory. The head was above the brim, the pains powerful, and the tumour so very tense as to feel like bone. Under the impression that it was really osseous, its puncture was not thought of. With great difficulty delivery was accomplished by Levret's forceps; the child respired once or twice, but could not be restored. It was now ascertained that the tumour was not bony, and, had it been punctured, it is exremely probable the child would have survived. Some weeks after delivery, I examined the *pelvis*, and found the morbid growth much smaller. A year afterwards, when I attended her again in labour, it had altogether disappeared."

The annexed highly interesting case was kindly forwarded to me by my very highly esteemed friend, Mr William Birch, of Barton-under-Needwood, formerly lecturer on midwifery at St Bartholomew's Hospital.

Case 3. On the evening of Sunday August 23, 1835, I was requested (observes Mr Birch) by Mr Adams of Burton, to see Mrs H., upon whom he had been in attendance.

" Since Friday afternoon, she was in labour of her first child, although she had been married five or six years. She had strong and regular labour-pains, and on examination I found the *pelvis* occupied by a rounded hard unyielding tumour, which so nearly filled its cavity, that whilst it occupied the hollow of the *sacrum*, as far as the sacro-sciatic ligament, left a space (according to my computation) of barely an inch and a-half between it and the *symphysis pubis*. So completely did this tumour prevent the descent of the child's head, that it was only by using a considerable degree of force that I could touch it with the extremity of my fore-finger, above the *symphysis pubis*. The *os uteri* was but partially and imperfectly dilated, it was hard and tumid, its anterior and posterior edges were almost in contact, whilst it had a lateral diameter of perhaps a couple of inches. The finger introduced into the rectum assured me that this tumour was placed between it and the *vagina*, probably in the fold of *peritoneum* reflected from one to the other.

On inquiry, I found that Mrs H. had for several years a tumour at the lower part of the right side of the *abdomen*, which she first became aware of whilst making some sudden exertion; that after the *abdomen* had enlarged from pregnancy, this tumour was no longer perceptible, nor had it been since. But so imperfect was the description given of this tumour both by Mrs H. and her husband' that the above facts seemed to be all that could be relied upon. She had not consulted any medical man on account of it, but had always considered it a rupture. I thought it more than probable that the tumour our patient had so long been aware of in the *abdomen*, was the same which was now in the *pelvis*, and that it was a tumour of the ovary. But what was its nature? did it contain fluid, or was it a solid mass? It conveyed to the finger the precise sensation conveyed by an osteo-sarcomatous tumour; it felt precisely like a large mass of cartilage; it was not softer in one part than another; there was no fluctuation; it was not harder during the pains than during their absence. In the belief that it was a solid mass;—what was to be done? Was it possible to raise the tumour out of the *pelvis*?

I had the patient placed on her hands and knees with the hips much elevated, and made an effort with my hand to thrust the tumour through the upper aperture of the *pelvis*; but it proved as I had anticipated, perfectly immovable. Embryotomy was impracticable;—the Cæsarean section seemed to afford the only means of delivering the woman; but before having recourse to this formidable operation, could there be any objection to thrust a trocar into the tumour to explore its nature? Knowing that the most experienced surgeons are liable to mistake solid for fluid tumours, and *vice versa*, was it not imperative so to do? I requested the assistance of my friends Dr Rawson and Mr Allford of Lichfield. Owing to some accidental delay of the messenger dispatched for them, they did not arrive before six o'clock of Monday morning. They agreed with Mr Adams and myself in the propriety of puncturing the tumour, and accordingly I introduced a long curved trocar into it through the *rectum*, and on withdrawing the stilette, to our astonishment and delight, about seven ounces of a clear, straw-coloured viscid fluid, which proved to be albuminous, escaped through the cannula.

The tumour was very much diminished; a few pains gave the *os uteri* a circular form, and brought the head of the child within reach of the finger; and although the cyst from which this fluid had escaped was distinctly to be felt hard and of considerable bulk, yet none of us had any doubt of the possibility of delivery being accomplished by the efforts of the *uterus*, provided they remained powerful. After a time, however, the pains began to abate. Several small doses of ergot of rye were given without producing much effect. The patient complained of tenderness of the *abdomen*, and became very impatient to be delivered. There was the strongest evidence of the death of the child, for the mother had not felt its movements for more than twenty-four hours; the scalp had not swelled in the slightest degree, and the child's heart no longer pulsated, as we all assured ourselves by means of the stethoscope. I, therefore, in the afternoon of Monday, punctured the head, and delivered our patient easily of a full-grown child, which had already begun to putrify. She had not one untoward symptom except a slight swelling of one leg, was down stairs the following Sunday, and I hear has remained quite well ever since.

The remarkable circumstances of this case appear to be the extreme hardness of the tumour, which I think could have led any one to believe it was solid, and the great diminution of its size, or rather the great increase of space in the *pelvis*, afforded by the evacuation of so small a quantity of fluid. The former fact will for ever impress on my mind the propriety of tapping in all such cases.

Case 4. Three years ago I was called to a case of reported difficult labour, but I made no examination, the child having been delivered by the perforator and crotchet prior to my arrival. A year afterwards the patient was delivered of an immature but living child. The succeeding labour commenced on Friday the 26th September 1835, and her surgeon was summoned about ten P. M. My attendance was requested at eight o'clock the following morning. The *pelvis* from the brim to the *coccyx* was very nearly filled by a large and apparently unyielding tumour, (not unlike a full sized fœtal head,) bulging into the *rectum*, and from its tension supposed to be altogether solid. The head of the child could be distinguished resting over the *ossa pubis*, and the pains had been very forcible the nine preceding hours. A long trocar was passed *per rectum* into the tumour obliquely upwards, and on being withdrawn ten or twelve ounces of dark serous-like fluid tinged with blood gushed out forcibly through the cannula. The sac immediately collapsed, but the pains unfortunately disappeared, and having waited three hours the forceps were applied, and the patient promptly delivered of a living child. She recovered without a single bad symptom.

I examined the *vagina* five weeks after delivery, and found the tumour fully as large as before it was punctured. The *uterus* lay very forward, and its mouth only could be felt, which touched the *symphysis pubis*. The tumour had descended as low as the extremity of the *coccyx*. Between the *pubis* and *sacrum* two fingers could not be made to lie in parallelism. One finger could be passed between the tumour and the left side of the *pelvis*, the right side of the *pelvis* was quite filled up by it.

I may add, that in two instances with which I am familiar, the pressure of the prolapsed *ovarium* loaded with purulent fluid produced fatal *ileus*. In one of these the tumour filled the *rectum*; neither bougie nor injection could be conveyed beyond it, and such was its apparent solidity, that I did not for a moment contemplate the puncture. But the deception was fatal to the patient. The second case, very similar in all respects to the foregoing, occurred in the practice of a surgeon in the country, who sent me its history, and the morbid parts for examination.

The liability of encysted tumours in the *pelvis* to form fistulous communications with the neighbouring parts furnishes another argument in favour of puncturing them. I submit a very interesting example.

*Tumour behind the Rectum.**—Case 5. Sixteen years since I visited a very healthy girl, about 12 years of age, who had fallen backwards on the ice, and was supposed to have slightly injured the sacral part of the spine. I recollect having occasion to pass the catheter once, and that the late eminent Mr George Freer saw the case in consultation with me. In a few days the girl had apparently recovered, and continued in perfect health to the period of her marriage, three or four years afterwards. She speedily became pregnant, and reached the full term of gestation. On the accession of labour, she was attended by two most respectable practitioners, by whom it was discovered that a very large and hard tumour proceeded from the posterior surface of the *pelvis*, and nearly filled its cavity. After waiting a prudent time, she was delivered by embryotomy. But so far from making progress towards convalescence, she daily decreased in strength, and about eight or nine months after her delivery, I was desired to visit her. She was much emaciated and hectic, and suffered considerable pain in the back and *pelvis*, and agony in voiding urine, which was loaded with a thick fluid. A similar secretion constantly escaped from the *vagina*, and from the *rectum* also. My earnest entreaties to examine the *vagina* were pertinaciously resisted, and after a few weeks additional suffering she died, attenuated in the last degree.

Examination after death.—A tumour was seen growing from the *sacrum* and sides of the *pelvis*. The bony structure in contact with the disease was perfectly carious, and portions of it were necessarily brought away in detaching the tumour from its connections. The contents of the *pelvis* were then removed, and examined accurately at leisure. The tumour which surrounded the *rectum* was large, with thickened walls, encysted, and contained a quantity of fluid. The interior of the sac communicated by small fistulous apertures with the *rectum*, *vagina*, and bladder; and thus the source of the morbid discharges was most satisfactorily demonstrated. The *uterus*, which was healthy was destitute of its vaginal portion, a small round orifice excepted. The ovaries were natural, the *vagina* was slightly inflamed, the bladder was greatly thickened, and its mucous coat in the highest state of inflammation. The bladder disease was productive of nearly all the patient's acute sufferings, and ultimately of her death.

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* A case is already on record of a tumour having formed behind the rectum, and from which six pints of straw-coloured fluid were discharged by puncture.—Mr Jackson's case in Medical Repository for March 1826.

The preparation is deposited in the Museum of the School of Medicine.

The management of cases which have been treated by puncture and the incision and extirpation of vaginal tumours, are considered in connection with similar operations upon the *uterus*, and allusion made to the Cæsarean operation, and the induction of premature labour.

6. *Tumours attached to the Uterus.* The frequency with which fibrous tumours form in the substance of the *uterus*, especially in virgins after the 35th year, barren women, and women who do not bear children before this period of life, is remarkably striking. It is also a somewhat singular fact that diseases of a very dissimilar kind are found co-existing in the same *uterus*, to wit, fibrous, steatomatous, or fibro-calcareous tumours, which have no malignity of character, and ulceration of the mucous lining of the most malignant kind.* As a general principle it is held that the growth of a fibrous tumour is restrained by its early induration, the structure softening with its increase, and again acquiring density on the deposition of earthy material. Tumours imbedded within the proper tissue of the *uterus*, but not implicating the Fallopian tube, do not prevent impregnation, and thus fibrous diseases and pregnancy are frequently combined. If developed immediately underneath the peritoneal coat at the *fundus*, it may acquire a degree of mobility, and by projecting into the *abdomen*, be confounded with a moderately enlarged *ovarium*, but the same ambiguity cannot apply to a tumour in connection with the lower part of the womb. In the unimpregnated state, the existence of a tumour of moderate dimensions may not even be suspected; but when associated with pregnancy, the increase it then undergoes may lead to its detection. It either remains tranquil throughout pregnancy, and escapes observation, or the passive state merges into subacute inflammation, the substance being painful when examined with the hand, or subjected to accidental pressure. The constitution participates in the excitement, as denoted by deranged, gastric, and intestinal functions, increased frequency of pulse, and more or less emaciation. These symptoms soon yield to judicious treatment,—comprising the application of leeches, reposing on the back or the side opposite to the tumour, the moderate use of anodynes, the regulation of the bowels by very mild means, and a spare unirritating species of

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* I have a specimen of this nature, which presents a tumour softening in its centre, inclosed in a complete bony case, and a soft fungus growing from the cavity.

diet. In subsequent pregnancies, the tumour is not found to enlarge in the same ratio, and occasions but little comparative inconvenience.

A tumour which is limited to the *fundus uteri* cannot offer resistance to labour, otherwise than by interfering with the axis of the *uterus* and *pelvis* respectively; but not only may it occasion the malposition here alluded to, put prove a source of great danger after delivery, by provoking hemorrhage or inflammation; not that its presence necessarily produces either of these evils. A steatomatous growth the size of a large orange was unexpectedly found imbedded in the *parietes* of the *fundus uteri*, of a woman late of this place, who died apoplectic eight days after delivery, and similar discoveries have frequently been made. Whether in the instance referred to the cerebral affection was connected with the state of the *uterus* is matter of conjecture. The brain presented a natural appearance, and (excepting the *uterus*) the body also. A tumour in connection with the *cervix* impedes labour, partly by its bulk, but chiefly by the long axis of the *uterus* and that of the pelvic brim no longer corresponding.

Case 1. A lady, four months advanced in pregnancy, and suffering abdominal pain and inconvenience, directed my attention to a hard substance the size of an egg, tender to the touch, and situated above the left groin. The symptoms soon subsided, and she experienced little or no pain, unless she attempted to repose on the left side. On labour ensuing, the *os uteri* was very obliquely situated, and the substance (now greatly increased) was movable, and situated between the *umbilicus* and the spine of the *ischium*. To obviate the obliquity of the *uterus*, the patient was placed on the contrary side, and a bandage applied firmly round the *abdomen*. The labour speedily terminated.

A fibrous growth, although more frequently attached to the body and *fundus* of the womb than to the *cervix*, is sometimes confined or nearly so to this structure, or gradually extends to it, occupying the pelvic brim, and presenting a formidable obstruction to delivery. Dr Merriman has published an instance of this kind, which ended fatally; myself a second; and others are on record.

I have at this moment a patient in whom a large globular fibrous tumour fills up the front and sides of the brim of the *pelvis*, like a full-sized fœtal head; the substance commenced in the body of the organ, and produced no interruption to several successive deliveries, but it has now so completely encroached upon the neck of the womb, that delivery *per vias naturales* would be almost, if not altogether, impracticable. The bulk of some of these growths is astonishing. In the most striking example which I have yet seen, an apparently fibro-calcareous enlargement resembles in size the *uterus* at the seventh month of pregnancy; and Mr J. Wilton had a case of pelvic tumour, which formed very rapidly, and acquired in nine months a weight of forty pounds. Several instances of impracticable delivery from obstructions of this nature are on record. In Dr Montgomery's very interesting case the Cæsarean section was rendered necessary by a tumour whose structures were solid throughout. When a tumour connected with the *pelvis* appears to be of an almost bony structure, the less it is interfered with the better, since inflammation will almost certainly be the consequence. But it is important to recollect that the walls of a tumour may be composed chiefly of osseous materials, whilst its centre contains fluid. I once removed after death a large quantity of fluid resembling thin honey from a bony tumour, as hollow as a melon, which grew from the *pelvis* of an adult female. The walls of the tumour were certainly too firm to have collapsed on the evacuation of the fluid; but as respects a more yielding organization the fact cannot be unimportant. It will apply for instance, to fibrous tumours, some of which contain both blood and serum, and thereby influence our practice. When labour is obstructed by a tumour of the *uterus*, we must ascertain as far as possible its structure and boundaries, and whether it projects towards the *abdomen* or the uterine cavity. Instances are recorded of tumours which were connected to the *uterus* by means of a narrow basis or an unusually lax cellular tissue, having been expelled through the *vagina* at the time of parturition, either before the child or quickly after delivery; a fatal instance of which has been recorded by Gooch.* In treating a tumour of the *uterus* the first thing to be determined is whether the mass admits of elevation above the brim; an improbable, but by no means an impossible event. I subjoin a short but interesting case, in which the elevation of a tumour above the brim was accomplished under circumstances of the most adverse nature.

Case 2. It was the patient's eighth pregnancy. The sixth labour was impeded by a tumour, but it terminated naturally. The seventh pregnancy terminated at the sixth month. In the eighth the patient went on to the completion of the term. The tumour, grooved in form, proceeding from the right and back of the *uterus*, and embracing half its neck, so completely filled the pelvic cavity as to resist the passage of the finger beyond it. The effect of the uterine contractions caused it to descend still lower. A portion of the fœtal head was at length touched, on passing the finger through the small aperture, between the *pubes* and the tumour. At this juncture, and after the Cæsarean operation had been fully resolved upon by four practitioners, an attempt was made in the intervals of pain to push up the tumour towards the posterior part of the right illiac *fossa*. It succeeded admirally. Under violent action the head descended and occupied the place from which the tumour had been raised, and a fresh contraction was followed by the birth of a living child. The tumour now descended again into the pelvic cavity. The neck of the *uterus* appears to have been slightly torn, but the patient recovered very favourably. *

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* Diseases of Females, page 290.

From this case we derive the strongest encouragement in favour of a cautious but persevering effort to elevate a tumour of this nature above the pelvic inlet.

Assuming the attempt to fail, and the foreeps to be inadmissible, we have four plans for selection, viz. the puncture or incision of the tumour, the diminution of the child's head by embryotomy, the extirpation of the obstructing medium by the knife, and *lastly*, the Cæsarean section.

Puncture and incision of tumours.—The practice of puncturing tumours having been fully considered, any further allusions on this head will be very brief and incidental. Before proceeding to the dreadful operation of embryotomy, most important may it be to ascertain whether the tumour contains a fluid. Assuming its contents to be in some measure fluid, and yet too consistent to pass through a cannula, we have to consider whether it admits of being discharged by an incision. The supposition is far from imaginary, as I now proceed to show. In support of the beneficial effects of opening tumours of an apparently solid character, I refer with much satisfaction to an instructive paper published by Mr Evans, the intelligent surgeon of Belper, in Derbyshire, by whom the whole *uterus* was extirpated with success. It appears that Mr Evans was called to a woman in the middle months of her first pregnancy, on account of pains and inflammatory symptoms, about the *pelvis* and *abdomen*, attended with a complete suppression of urine.

On introducing the finger into the *vagina*, " I was astonished (he observes,) to find a large tumour the size of a child's head, and incompressible, and feeling like a bony or cartilaginous substance, connected to the upper and back part of the *vagina*. I could not feel the *os uteri*, nor indeed any part of the *uterus* from the *vagina*. The patient was delirious, and the symptoms generally formidable. On puncturing the tumour only ʒij. of thick jelly like fluid were drawn off, and an anodyne enema was afterwards administered. Relief was obtained for twenty-four hours, when the bad symptoms returned with every mark of approaching dissolution. I immediately determined on making a large and free opening into the tumour. This I accomplished by means of a double-edged scalpel, but not without some difficulty. The walls of the tumour felt almost as hard as cartilage, and were about half an inch thick. The same jelly-like substance came slowly away on introducing the finger still farther into the wound, and I could feel several tumours of various sizes growing to the inner surface of the sac; some of them came away in a few days, and put on something like the appearance of spermaceti."

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* Bulletin Medical Belge (No 9 for September 1835,) par le Docteur Thirion de Namur.

The patient completely recovered, and although there does not appear to have been any immediate collapse of the tumour, it had entirely disappeared before the whole term of pregnancy had arrived, when she was safely delivered, and remained in perfect health some years afterwards.*

If it is said that this case is not exactly applicable, let me adduce an example, which bears closely upon the point, premising incontestible evidence to show, that the process of softening which this particular tumour underwent is common to other cases. After Dr Lee's able exposition on tumours of the *uterus*, it can scarcely be doubted that a very close analogy subsists between fibrous and polypous growths; and it has been shown by Mad. Boivin in particular, that the interior of *polypi* are sometimes quite hollow. Andral says, "we occasionally meet with serous cysts of various sizes in the walls of the *uterus*."† M. Jourel's celebrated case of alleged retroversion, in which the *liq. amnii* was supposed to have been evacuated by puncturing the *uterus*, but which was never followed by the fœtus or membranes, now turns out to be a tumour with fluid contents. "It is plain (says Mad. Boivin) that there was neither pregnancy nor retroversion in the case, but rather an encysted tumour, pushing and curving the *uterus*, emptied by the puncture, and healed by the inflammation and suppuration of its parietes."‡ In reference to the structure of fibrous tumours of the *uterus* Dr Lee observes;—"cavities, containing a bloody or dark-coloured gelatinous fluid, are sometimes formed in the central parts of the tumour by a process of softening which its substance undergoes."§ These quotations appear quite conclusive. It is contended not that fibrous tumours usually contain fluid, for this is not their ordinary character; but that they sometimes do possess fluid contents is shown by the following case.

A skilful practitioner perforated the *cranium* on account of a large and unyielding fibrous tumour of the *cervix uteri*, which appeared to be entirely solid and completely obstructed labour. It was impracticable to apply the forceps. The patient died after delivery. On examination after death, it was found that several small solid fibrous tumours had formed in the uterine *parietes*; but the large tumour which obstructed the labour, though firm in its exterior coverings, contained a space which was filled with glairy fluid. The case was most ably treated. The size of the cavity is represented in the drawing [Plate fourth.]

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* See Transactions of the Associated Surgeon-Apothecaries, Vol. i. page 211.

† Path. Anat. translated, p. 673.

‡ Boivin, Pract. Treat., p. 80.

§ Medico-Chirurgical Transactions, Vol. xix. p. 96.

I am far from inferring that the tumour could have been sufficiently reduced by puncture to have superseded embryotomy. I believe it could not, and am merely desirous of stating the question of puncture in reference to cases which appear altogether adapted for it. Before perforating the *cranium* of a living child, in a case of fibrous tumour of the *uterus*, I would not hesitate to pass into the tumour a long needle, (like a couching-needle,) having a groove in the centre, or otherwise a very fine trocar, and provided the tumour can be shown to contain fluid a free puncture should be at once adopted. The risks which attend the puncture are twofold, namely, venous hemorrhage and inflammation. The practice, therefore, should be limited to tumours which have not become calcareous, and enforced with the double view of preserving the child, and averting the formidable effects which a long-continued pressure on the soft parts will almost certainly occasion. Doubtless the quantity of fluid may be found too small to compensate for the risk of puncturing,—an objection which is equally applicable to vaginal tumours. The enlarged and prolapsed ovary, for instance, has been found entirely solid, and in one of Mr Park's cases nothing but blood followed the puncture, nevertheless the fœtal head immediately descended, and came within the reach of the finger.

The coincidence of pregnancy and *polypus in utero* is rather unusual. In an instance related by Dr F. Ramsbotham the *polypus* in its exit from the *vagina* preceded the child's head, and it was determined very judiciously to return the *polypus* into the *vagina*, and remove it after a given period by ligature.[*] In a similar instance to this the ligature was applied directly after delivery; but it produced a fatal effect.[†] I have elsewhere detailed a case of this nature; but the bond of connection between the *polypus* and the *uterus* was dissevered by the efforts which attended the expulsion of the child. The removal of a *polypus* which descends into the *vagina* and obstructs the labour may become an object of contemplation. The ligature and incision should be here combined.* The selection of the part through which the puncture should be made may demand some consideration. It might be preferable to puncture through *rectum*, provided the bulging is felt more distinctly there than elsewhere, and the wound will neither be irritated by the finger, nor exposed to the pressure of the child in its delivery, the difficulties attending which it will not be possible to anticipate. On the other hand, the *rectum* would be considerably irritated by a fistulous wound; although it is probable, a wound thus situate would heal very rapidly, and on this account a second operation at some distant period would probably be necessary. A wound in the *vagina* would be less liable to heal, on account of the *lochia* passing continually over it. If it were determined to incise the tumour the *vagina* will of course be selected and not the *rectum*. The site for puncturing a tumour which originates behind the *rectum* requires no observation.

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[*] A fatal case is recorded of the expulsion of a polypus after delivery.—See Med. and Phys. Jour. Vol. xxvi.

[†] Davis, Obstetric Medicine, p. 29, p. 641.

Excision of Tumours from the Vagina or Uterus.—The proposal of excising a tumour which is in close connection with the internal genitals demands the gravest consideration. *First*, let us suppose a tumour originating from the *vagina* increasing in size until it fully occupies its cavity sensibly affecting the neighbouring parts, and during labour actually obstructing the descent of the child. The forceps are inapplicable. Is the tumour susceptible of diminution by puncture? If not, should it be laid open, or excised altogether, or must the *cranium* be perforated? But this important inquiry arises, what is its nature? Can it possibly be an adherent ovary—the excision of which might occasion serious hemorrhage or *peritonitis*, or does the tumour arise from the *vagina*? In order to decide these questions, a few of the recorded cases of excision may now be adduced.

M. Pelletan excised two tumours which had been formed in the *vagina*, the one of an adipose, the other of a fibrous texture.† Dr Drew's two cases have often been adduced.‡ In each case a tumour proceeded from one of the sacro-sciatic ligaments. The first patient died, and it was then discovered that the tumour could have been easily removed. In the second case, in consequence of the obstruction occasioned to labour, the tumour was extirpated by cutting through the right side of the *perineum* and *anus*, and the patient then delivered by the forceps of a living child.

A somewhat similar operation in a case of fatty fibrous tumours was performed by Professor Burns.§ The incision was made on the left side of the vaginal orifice, *perineum*, and *anus*, through the integuments, cellular tissue, and *transversalis perinei*, and the tumour dissected away from its connections. Delivery took place four hours afterwards; and notwithstanding an attack of *peritonitis*, the woman recovered.

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* Pugh tied and then excised during labour a fleshy excrescence from the *os tincæ*. Pugh's Midwifery, p. 121.

† Clinique Chir. Tome, i. p. 203 and 224.

‡ Ed. Med. and Surg. Jour. Vol. i. p. 20.

§ Principles of Midwifery, eighth edition.

If the forceps or vectis are inadmissible, and the question of embryotomy is suggested, Merriman asks, " Whether the solid *ovarium* in this situation should not be incised and its contents removed, or the *ovarium* extirpated?" Having commented on the practicability of the measure, and on the danger attending all operations on parts in connection with the *uterus*, he adds;— " If the ovarian tumour were so extensive as either to impede the descent of the child's head by its bulk, or to prevent the action of the womb by its weight, or, by its confined and imbedded position in the *pelvis*, the safety of both mother and child might be promoted by the operation." And again, " I am disposed to believe, that where the tumour in the *vagina* occupies a large space, it would be a more warrantable practice to remove it by excision if it consisted of a solid substance, and certainly to puncture it if it contained a fluid, rather than expose the child to certain death, and the mother to great hazard, by employing the perforator." [*]

The incision of a solid fibrous tumour from the *cervix uteri* can rarely become an object of contemplation, provided, however, the tumour is limited to the vaginal portion of the *uterus*; that it is loosely connected, or has a narrow basis, and is in other respects tolerably accessible, its removal may certainly be accomplished, but a combination of these favourable circumstances will very rarely occur. Andral, in speaking of these diseases, says, " The laxity of their connection with the *uterus* is such, so as to be capable of being removed with the greatest ease, without injuring the substance of the organ." [†] Lisfranc removed a tumour by making incisions through the *uteri;* but Dr Lee truly observes, " In most cases fibrous tumours cannot be removed by art while they remain within the cavity of the *uterus*." [‡] At the present time I am treating a number of patients, in whom fibrous tumours have formed in the uterine tissues, and in no one case would an operation be practicable. An instance to the contrary, nevertheless, occasionally occurs; and very lately my friend, Mr Samuel Evans of Belper, very much to his credit, successfully removed a large fibrous tumour from the *uterus* of a woman who had been recently delivered. The whole *cervix* might indeed be excised; but, arguing from my own personal experience, this operation is by no means so simple in its nature as certain French authors lead us to infer. Assuming the removal of a tumour to be correct in principle and feasible in practice, the period for its accomplishment should be regulated by the necessity of the case. The prodigious increase which these bodies acquire during pregnancy might furnish an argument in favour of an operation under that condition of the system. Thus, in a case related by Merriman, a fibrous tumour was removed from the *os uteri* by ligature during pregnancy *.

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[*] Med. Chir. Trans. Vol. iii. p. 54 to 56.

[†] Path. Anat. translated, p. 672.

[‡] Cyclop. of Pract. Med. Vol. iv. p. 393.

Induction of Premature Labour.—Premature labour may with great propriety be proposed on pregnancy recurring, assuming the delivering of a living child at term to have already proved impracticable, the tumour to remain unchanged, and its excision not deemed expedient.

Cæsarean Operation.—I have merely to refer to Dr Montgomery's case and observations in support of the indispensable necessity of this operation in the most extreme class of cases which we have considered. †

Dystocia from Scirrhus Uteri.—Instances are on record of delivery having been rendered impracticable by extensive scirrhus of the uterine orifice. Small incisions have been recommended as best adapted for extreme cases of this description.

Treatment after Puncture or Incision.—The evils consequent upon a morbid growth within the soft parts may or may not terminate with the labour. If originating from the *vagina* the enlargement will probably disappear, but this will be contingent upon the evacuation of its fluid contents, the perfection of the adhesive process, and the absorption of the thickened walls. Where a tumour exists in the *vagina* it is very important to examine the canal soon after delivery. Thus one of Mr Park's patients died of vomiting and constipation three days after parturition, which was accomplished solely by the natural powers. Examination may be necessary not only to prevent the formation of stricture, which has been known to attend the healing and consolidation of tumours extensively opened during labour, but to ascertain whether the fluid may not have been reproduced, in which case a favourable period must be selected for renewing the puncture and producing consolidation of the sac, or otherwise discharging its contents by a free incision. It has already been remarked, that the structures of a tumour connected to the *uterus* may inflame and occasion an acute peritoneal disease, which, if not immediately checked by vigorous measures, will terminate fatally. The inflammation may, however, be of the subacute kind, and should be treated by leeching the *hypogastrium* and *vulva*, dry fomentations, soothing vaginal injections, aperient *enemeta*, opiates, and the hip-bath. Subsequently the *hypogastrium* may be covered with a plaster composed of soap, iodine, and belladonna; hydriodate of potash given internally in *sarsæ syrup*. the regular evacuation of the bowels should be enforced, and the hair mattress substituted for the feather bed. By these means the tumour, if not partially absorbed, will become so perfectly passive that the patient will be scarcely conscious of its existence. When pain is produced by the pressure of the tumour on the pelvic nerves, mercury given to produce its specific effect gently but steadily has, in my own experience, been productive of very beneficial effects.

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* Synopsis, p. 234.

† Dub. Journ. of Med. and Chem. Science, No. 18, Vol. vi. p. 418. Dr Davis thinks that if it were feasible to make a material incision into the *abdomen* with a view of extirpating the tumour, whatever it might be, it would be preferable to the Cæsarean section.—Operative Midwifery, p. 111.

For detailed information on tumours and obstructions in the soft parts to the progress of labour I refer to the following works.

Giffard's Cases (Case 100,) 1734.
Smellie, Vol. ii. Coll, xxi. No. 2. Case 3, 4, 1754.
Perfect's Cases, Vol. ii. p. 341, 1781, 1783.
Denman, Vol. ii. p. 65 to 75, 1795.
Edinburgh Medical and Surgical Journal. Vol. i. p. 20.(Drew's Cases.)
Do. Do. Do. Vol. xxxv. p. 82. (Heming's Cases.)
Medico-Chir. Trans. Vol. iii. x. and xvii. (Park's and Merriman's Cases, and a case by Mr Hewlett.)
Merriman's Synopsis, 4th edition, p. 57.
Clinique Chirurg., Tome. i, 203, 250. (Pelletan's Cases.
Boyer, Traité, Tome x. p. 394.
Burns' Principles of Midwifery, 8th edition, p. 34.
Gazette Med. de Paris, March 1835.—Lisfranc, Leçons sur les Maladies de l'Uterus.
Davis' Elements, p. 105, and Obstetric Medicine.
Ramsbotham's Cases, Vol. i. p. 337, 341, 343.
Baudelocque.
Do. in Recueil Periodique, Vol. v.
Gooch on Diseases of Females, p. 290.
Journ. Gén. de Médecine, Tome. lxxii. p. 242.
Dublin Med. Trans. 1824, Vol. iv. p. 258.
Blundell's Lectures, Lond. 1834.
Ramsbotham's do. in Lond. Med. Gazette.
Rigby's Lectures in London Medical and Surgical Journal.

ART. IX.—*On the influence of different Professions on Pulmonary Consumption.* By H. C. LOMBARD, M. D., Geneva. (Extracted from an unpublished work on Pulmonary Consumption.) Annals of Public *Hygiene,* Vol. xi. Part i.

[IT is proper to mention as preliminary to the present article, that the subject of the influence of different professions upon the developement of diseases of the lungs generally, and consumption in particular, has occupied the attention and research of many physicians. The subject has been investigated more or less extensively by Dr Alison, Mr Thackrah, Dr Knight, M. Benoiston de Chateauneuf, Dr Forbes, and Dr Lombard. The English physicians have chiefly considered the influence of such particular professions as come within the observation of each. The foreign physicians have been enabled, by the extent and great population of the foreign hospitals, to take a more extensive range, and to found their inferences on the influence of all the professions. Those of Dr Alison, Dr Knight, and Dr Forbes, are the most accurate on the influence of particular occupations; but of those which have been directed to the influence of all the professions, those of Dr Lombard are perhaps the most comprehensive. Though it is unreasonable to expect that attempts of this kind can lead at the present time, when the inquiry is almost in its infancy, to results entirely accurate, yet, as the researches of Dr Lombard have been subsequent to those of M. Benoiston de Chateauneuf, and have been deduced from a very extensive collection of observations, they may be regarded at the present time as the most complete extant; and we believe that the readers of the Edinburgh Medical and Surgical Journal will be pleased to see the results which have been derived on a subject of so great importance as the Etiology of Consumption, from the extensive field of experience afforded by the Continental Hospitals.]

THE frequent prevalence of diseases of the chest in certain classes of workmen has been long observed by many authors; but most of them have been satisfied with stating the fact without adducing in its support indisputable proofs, although statistical researches afforded a simple method of verifying their opinions and converting them into exact and positive facts. The memoir which I now submit was undertaken in order to ascertain whether the prevalence of consumption in certain professions did not throw some light on the causes and the treatment of this formidable disease.

The facts which form the basis of this memoir may be divided into five series.

1. The lists of cases collected by the pupils of the hospitals of Paris have furnished me with the occupations of 1495 males, and 1075 females, who have died phthisical in these establishments.

2. M. Julius, in his researches on the sanitary state of the town and hospitals of Hamburgh, gives a list of the occupations of 573

patients admitted into the General Hospital. He also distinguishes the professions of 103 workmen cut off by pulmonary consumption in the same hospital. The comparison of these two lists may serve to establish the degree in which consumption prevails in the different professions.

3. The Medical Annuary, published at Vienna in 1803, contains the sketch of the diseases treated in the General Hospital during the years 1798, 1799, and 1800; and as in this sketch the amount of 1969 patients are arranged according to their occupations, we may thence infer the comparative frequency of pulmonary consumption in each class of working persons.

4. M. Benoiston de Chateauneuf submitted recently to the Institute researches on this subject. He compared the number of patients furnished by each profession to the hospitals of Paris with the number of deaths caused in each profession by pulmonary consumption. These results were formed from 26,074 diseased workmen, 745 of whom died consumptive; and also from 17,447 workwomen, of whom 259 died consumptive.—(*Annales d'Hygiene Publique*, &c. July 1831.)

5. Finally, the last documents from which I have studied to determine the influence of professions in pulmonary consumption were collected at Geneva. I have extracted from the mortality records from 1776 to 1830, the professions of all the adults who have died in the city of Geneva, including the township of Plain-Palais and Eaux-Vives. The total number of deaths amounts to 8829, and that of consumptive patients amounts to 1003. The profession of the work-women is accurately marked only from the year 1816, and the table of their deaths contains only 1767, of which only 187 were occasioned by pulmonary consumption.

The materials now enumerated are not all of equal value. Those collected in the hospitals inform us only of the number of consumptive persons who apply for the assistance of the charitable institutions, and cannot tell us what is the comparative frequency of consumption in each profession. If we consult the registers of admission into the hospitals, we are elsewhere liable to obtain inaccurate results, because, since the long duration of consumption often allows patients to resume their occupations temporarily, the same individual may appear several times in the course of a single year, and thus increase the proportion of consumptive to other patients. If, on the other hand, we follow the procedure adopted by M. Benoiston, that is, if we compare the number of patients admitted into the hospitals with that of deaths proceeding from consumption, the inconvenience now specified is obviated, but we nevertheless obtain no precise result as to the prevalence of consumption. It is of little moment for us to know, that among 98 starch-makers admitted into the hospitals, only one dies phthisical. What is important to know is the relation of the deaths by consumption to the total amount of deaths in each profession. The researches made by me in Geneva furnish this proportion with a degree of accuracy which the documents collected in the hospitals cannot approach. All the deaths of workmen, indeed, following the same profession, be they rich or poor, young or old, natives or strangers, are enrolled in the Mortality Records of the Civil State, which give at once the proportion of consumptive persons in the better classes of society, and in all those whom fortune keeps away from hospitals.

The assemblage of these statistical documents will serve to determine the following two questions:

First, To determine the influence of the different professions upon pulmonary consumption.

Secondly, To discover the causes of the comparative rarity or the frequency of consumption in the different professions.

PART FIRST.

On the influence of the Professions in Pulmonary Consumption.

The authors who have studied the subject of the *hygiene* of the professions have specified two striking species of influence which they exercise on pulmonary consumption; one pernicious and consequently productive of the disease, the other salutary or prophylactic. The professions which have been regarded as the cause of many consumptive diseases are those of manufacturers of mineral acids (1,) of actors, singers, pleaders, performers on wind instruments (2,) needle-makers (3,) starch-makers (4,) workmen exposed to arsenical vapours, as stoneware-makers, painters, dyers, founders, &c. (5;) stocking-makers (6,) bleachers (7,) bakers (8,) carders of silk (9,) woollen (10,) wadding (11,) and hemp (12;) quarriers and stone-cutters (13;) candlemakers (14,) carpenters (15,) charcoal dealers (16,) braziers (17,) lime-burners (18,) rag-pickers (19,) curriers (20,) flour-sifters (21,) gilders (22,) winders (23,) pin-makers (24,) thread-makers (25,) copper founders and type-founders (26,) blacksmiths (27,) fullers (28,) engravers and carvers (29,) printers (30,) millers (31,) miners (32,) nurses (33,) wig-makers (34,) plasterers and beaters of plaster (35,) feather-dressers (36,) glass-platers and glass-polishers (37,) porters (38,) chimney-sweeps (39,) locksmiths (40,) soap-manufacturers (41,) corrosive sublimate manufacturers (42,) tailors (43,) dyers (44,) and lastly, glass-blowers (45.)

The number of professions which exercise a preservative or prophylactic influence against consumption is, according to authors, very inconsiderable. They are reduced to four, those of butchers (46,) coal-miners (47,) fishmongers (48,) and tanners (49.) We shall see that this list may be considerably augmented.

Such is the actual state of knowledge on this subject. We shall consider what new facts statistical researches add to those already known, and what are the erroneous opinions which they may serve to rectify.

First series of facts.—The 1495 phthisical persons whose deaths I have distinguished in the hospitals of Paris, are distributed among the different professions, as may be seen in the first table, where they are arranged in the order of the frequency of consumption, the first being those which present the greatest number of victims of this disease. We should nevertheless form a very erroneous idea of the frequency of diseases of the chest in the different professions if we adopt this test as expressing exactly the disposition of the different workmen to consumption. To ascertain this point, it is requisite to derive the proportion of the consumptive in the deaths of each year; but unfortunately this result cannot be obtained exactly, on account of the little care observed by several of the pupils in keeping their sheets of observation. Several are satisfied with inserting the admission of the patient without specifying the event of the disease; others keep their registers only during the first months of the year. Impracticable as it thus is to obtain exact results, it is requisite to be satisfied with an approximation only, and to adopt for the standard of comparison the table published by M. Villermé, which gives the population and deaths of the hospital during 1807 (50.) This table has been used to form the second list of the first table, where the workmen are also arranged in the order of mortality.

Comparison of these two lists may serve to determine the influence of different professions on consumption. If, indeed, this disease attacked the same number of persons in each profession, the order in which they would be arranged would be the same in both lists; but if the mortality from consumption be greater in certain kinds of professions and smaller in others, the place which they will occupy will be nearer to or farther from the beginning. In point of fact, this result is observed; since the cordwainers, which occupy the third place in the list of general mortality, is found first in that of consumptive cases; and hence we may infer that the trade of cordwainer counts a greater number of victims than the average medium. In applying this method to the two lists of the table, we may divide the professions into two classes; the *first*, consisting of those which appear to favour the developement of consumption, because they present a greater number of deaths from this disease; and the *second*, those which seem to prevent the developement of consumption, or at least, those which present a number of phthisical cases inferior to the general average.

1. *Professions placed above the average, or reckoning a number of consumptive cases superior to the general average* (51.)

Jewellers, ebony-workers, printers, polishers, lemonade-makers, turners, weavers, house-painters, sawyers, wig-makers, locksmiths, factors or dealers on commission, tailors, joiners, cordwainers.

2. *Professions placed below the average, or reckoning fewer consumptive cases than the average of other professions.*

Day-labourers, blacksmiths, farriers, masons, saddlers, carpenters, locksmiths, bakers, cooks, toy-dealers, coachmen, coopers, slaters, porters or door-keepers, quarriers, cartwrights, butchers, terrase-makers, gardeners, water-carriers, founders, wharf-porters and market-porters, wine-merchants, &c.

If we follow in the case of the work-women the course adopted above, we obtain the following results: The 1075 work-women cut off by consumption in the hospitals of Paris are divided among the different professions in the manner seen in the table, which contains also the list of the general mortality extracted from the table of M. Villermé. Comparison of the place occupied in these two lists by each profession enables us to distinguish them into two classes, as has been done in the case of the workmen.

1. *Professions placed above the general average.*

Burnishing women, weaving women, women cordwainers, binders and case-makers, knitters, gauze-makers, glovers, embroiderers, seamstresses, &c.

2. *Professions placed below the general average.*

Patchers or menders, day-labouring women, housekeepers, nurses, women porters or door-keepers, female tailors, wadding-carders, gardener women, hucksters, &c.

Second series of facts.—The 543 patients admitted into the General Hospital at Hamburgh are classed in the third table according to their respective professions; and the 108 workmen cut off by pulmonary consumption in the same hospital are arranged in the same manner. Comparison of these two lists, after the method already employed, furnishes the following results.

1. *Professions placed above the general average.*

Sculptors, domestic servants, glass-workers, barbers, house-painters, amanuenses, carpenters, turners, coopers, domestics, soldiers, cordwainers, tailors, &c.

2. *Professions situate below the general average.*

Day-labourers, masons, joiners, confectioners, turners, cabaret-keepers, tanners, potters, blacksmiths and farriers, comb-makers, butchers, locksmiths, bakers, &c.

Third series of facts.—The Medical Annuary of Vienna furnished the fourth table, which may enable us to estimate the influence of different professions on pulmonary consumption. Of 1969 patients admitted into the hospital at Vienna, 572 were phthisical, which furnish an average of *twenty-nine per cent.* Taking this number as the standard of comparison, the different professions may be distinguished into two classes, according as they count more or fewer than twenty-nine per cent. of phthisical persons.

1. *Professions placed above the general average.*

Musicians, day-labourers, ribbon-weavers, masons, police-officers, tailors, hatters, blacksmiths, soldiers, domestic servants, millers, &c.

2. *Professions placed beneath the general average.*

House-painters, butchers, barbers, porters or door-keepers, locksmiths, miners, shop-boys, carpenters, copying-clerks, weavers, ebony-workers, cordwainers, coachmen, gardeners, butchers, bakers, needle-makers, infirmary-servants,* cart-wrights, &c.

Fourth series of facts.—The tables published by M. Benoiston de Chateauneuf specify the professions of 26,074 patients admitted into the hospitals at Paris; and of this number 745 were destroyed by consumption, which gives a mean of 2.86 per cent. of phthisical cases. The different professions may be distinguished into two classes, according as they furnish in this amount a greater or smaller proportion of phthisical deaths, or, in other terms, according to the frequency of pulmonary consumption.

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* An Infirmary on the continent properly means the small hospital attached to a monastery or convent; and the *infirmiers* appears to be applied to the officer and servants of this establishment.

1. *Professions placed above the average.*

Feather-dealers, jewellers, crystal-cutters, gilders, hatters, copying-clerks, fringe-makers and lace-makers, tailors, polishers, cordwainers, charcoal-dealers, brushmakers, chimney-sweeps, gauze-makers, carders, and wadding-makers, millers, and plasterers.

2. *Professions situate below the medium.*

Street-porters and hall-keepers, water-carriers, wire-drawers, masons, ornamental painters, weavers, bakers, cotton-workers, bleachers, carpenters, quarriers, marble-cutters, sawyers of wood and stone, starch-makers, farriers, stone-cutters, rag-pickers, locksmiths, &c.

The same method applied to the classification of 17,447 workwomen admitted into the hospitals gives the following;—859 persons died of consumption; which affords an average of 4.92 per cent. of phthisical individuals.

1. *Professions situate above the average.*

Jewellers, feather-dealers, flower-makers, embroiderers, brushmakers, glove-makers, lace-makers, patchers, hatters, gilders, cordwainers, and shoe-binders, mantuamakers, seamstresses, &c.

2. *Professions situate below the general average.*

Lace-fringers, shaping mantua-makers, bleachers, polishing women, winders, gauze-workers, cotton-workers, carding girls, and quilt-weavers, rag-pickers, spinsters, &c.

Fifth series of facts.—We arrive at the facts collected at Geneva, that is, those presenting the highest degree of accuracy. They comprise the deaths of 8829 persons, of whom 1008 died consumptive, which gives an average of 114 phthisical persons per 1000. The professions may then be distinguished into two classes, according as they compute more or fewer than 114 consumptive persons in 1000 deaths.

1. *Professions situate above the average.*

Paper-makers, students, varnish painters, sculptors, copying-clerks, edge-tool-makers, vine-dressers, commission-agents, printers, hatters, brokers, tinsmiths, polishers, *gendarmes*, plasterers, lee-carriers, paviours, stone-cutters, engravers, machine-makers, calico-printers, locksmiths, ushers, brush-makers, watch-case-makers, soldiers, jewellers, spring-makers, enamellers, saddlers, design-painters, cooks, street-sweepers, terrace-makers, tailors, joiners, millers, wadding-makers, pastry-cooks, lapidaries, potters, cabinet-makers, teachers, card-makers, clock-makers, blacksmiths, lace-makers, lemonade-dealers, barbers, jockeys, draymen, quadrant-makers, watch-verge-makers, cordwainers, domestic servants, coopers, wig-makers, upholsterers, ministers of the Protestant church, ironmongers, bakers, file-makers, cellar-keepers, basket-makers, shepherds, teachers of arithmetic, officers, &c. The last seven professions have exactly the medium of consumptive cases; 11 per *cent.*

2. *Professions situate below the mean.*

Carpenters, surgeons, braziers, cutlers, goldsmiths, different merchants, woodcutters, tanners, advocates, bleachers, sedan-bearers, wharf-porters, stocking-makers, shamois-leather workers, charcoal-dealers, husbandmen, watermen, gilders, literary men, agents, pot-house keepers, handicraft workers, butchers, grocers, persons employed in public offices, binders, regents of colleges, glass-workers, commission-dealers, weavers, clog-makers, cloth-merchants, draymen, druggists, annuitants, gardeners, ancient officers, coach-drivers, confectioners, musicians, stable-boys, slaters, messengers, book-keepers, magistrates, language-masters (52,) vermicelli-dealers, moulders in wood, gaugers, needle-makers, packers, armourers, architects, agents, chimney-sweepers, skinners, cheese-mongers, innkeepers, funeral-bearers, chocolate-manufacturers, professors, wood-merchants, water-pipe makers, furbishers, bed-quilt-weavers, harness-makers, booksellers, snuff-dealers, candle-makers, coach-drivers, breeches-makers, stock-brokers, lawyers, infirmary nurse-tenders, chasers, notaries, coal-meters, physicians, dyers, porters, founders, &c. (52.)

The 1767 women cut off at Geneva since 1816, furnished 187 deaths by consumption, which gives an average of 106 consumptive in 1000 deaths. The different professions are divided in the following manner into two classes.

1. *Professions situate above the average.*

Makers of watch-hands, steel-polishers, gold and trinket-polishers, clock-makers, dressmakers, teachers, smoothing-ironers, brass-polishers, spinsters, women-tailors, washerwomen, housekeepers, day-labouring-women, brokers, cloth-merchants and mercers, tavern-keepers, workers in soap-lees, different merchants, &c. The three last present the mean number of consumptive cases, that is, 11 per cent.

Professions situate below the average.

Seamstresses, makers of watch-chains, nurses and infirmary women, calico-printers, cooks, hucksters, domestic servants, annuitants, laundresses, grocers, bleachers, gilders, counterpane-makers, butcher-women, midwives, bakers, gardeners, mattress-makers, appliers of leeches, &c.

Comparison of the five series of facts.—The lists which we have given have served to determine the question as to the influence of different professions on pulmonary consumption. But it is not enough to have established the fact that this disease is more or less frequent among the working classes of Geneva, Paris, Hamburgh, and Vienna. It is further requisite to prove that this circumstance does not depend on the kind of life of the workmen in certain countries, but rather on the influence of the professions on the health of those by whom they are followed. At this demonstration we shall arrive by comparing the place occupied by each profession in the five series of lists which we have now reviewed.

The comparison of the lists with each other shows at first, that, by combining the facts observed in different places, we have obtained documents on a much greater number of professions than if we had confined our researches to a single country. Among *two hundred and twenty* conditions enumerated in different lists, 144 or *two-thirds* have been mentioned only in *one* series of facts; but it is requisite to add, that the other 76 observed in two or several lists, include the professions pursued by the greatest number of workmen, and in which, consequently, it was most important to obtain precise documents.

A second fact which is demonstrated by the comparison of the lists, is the influence exercised by different professions on the frequency or the rarity of consumption. In 76 professions, indeed, contained at once in several lists, 22 or 29 per cent. are found the same number of times above and below the average; while the residual 54 or 0.71 occupy the same place in all the lists, or at least in the majority of the lists. The 71 hundredth parts of these professions appear then to exercise a direct influence on the developement of consumption, while the 28 hundredth exercise only an equivocal influence in this disease, the frequency of which they appear to augment in one country, while they seem to render it less frequent in another. The influence of different conditions upon the health of workmen, being therefore regarded as well established, it only remains to collect in a single list all those which precede, and to divide the professions into three classes, according as they are favourable, indifferent, or unfavourable to the developement of consumption, or, in other words, according as they present a number of consumptive individuals, superior, equal, or inferior to the general average.

Professions situate above the mean.

A. In men.

1. *In all the lists.*—Sculptors, printers, hatters, polishers, *gendarmes*, brush-makers, soldiers, jewellers, tailors, millers, quilt-makers, lace-makers, lemonade-dealers, domestic servants and wig-makers.

2. *In the majority of the lists.*—Copying clerks, cooks, turners, joiners, barbers, cordwainers, and coopers.

3. *In a single list.*—Ironmongers, vine-dressers, (founded on 6 deaths only, and wants confirmation,) commission-agents, brokers, tinsmiths, soap-lee carriers, paviers, engravers, mechanism workers, calico-printers, ushers, watch-case mounters, spring-makers, enamellers, design-painters, street-sweepers, pastry-cooks, watch-case makers, teachers, draymen, court-porters, quadrant-makers, watch pillar-makers, upholsterers, ministers of the Protestant worship. (The number of consumptive deaths is augmented by the death of several English ecclesiastics who have come in bad health to Geneva,) ironmongers, file-makers, basket-makers, shepherds, teachers of arithmetic, police-officers, servants, chimney-sweeps, feather-dressers, lapidaries, gauze-makers, printers, and ribbon-makers.

B. In women.

1. *In all the lists.*—Laundresses, cordwainers, glovers, and embroiderers.

2. *In the majority of the lists.*—Polishers.

3. *In one list.*—Watch-hand makers, clock-makers, dress-makers, teachers, smoothing-ironers, brokers, cloth-merchants and mercers, hatters, case-binders, knitters, trinket-dealers, feather-dressers, flower-makers, brush-makers, and lace-women.

A. In men.

Students, plasterers, stone-cutters, saddlers, terrace-makers, clock-makers, car-men, cellar-butlers (53,) goldsmiths, stocking-makers, charcoal-dealers, gilders, musicians, sawyers, and glass-makers.

B. In women.

House-keepers, day-labouring-women, wire-workers, weavers, gauze-makers, gilders, patchers, and mantuamakers.

3. *Professions situate below the medium average.*

A. In men.

1. *In all the lists.*—Coachmen, quarry-men, carpenters, inn-keepers, butchers, hall-porters, wharf-porters, street-porters, tanners, bleachers, watermen, confectioners, slaters, founders, infirmary attendants and nurses.

2. *In the majority of the lists.*—Bakers, blacksmiths, farriers, locksmiths, masons and weavers.

3. *In a single list.*—Surgeons, braziers, cutlers, different merchants, wood-cutters, advocates, sedan-porters, shamois-leather workers, agriculturists, literary men, merchants, grocers, those employed in the public administration, binders, regents of colleges, commission-dealers, loaders, clog-makers, drapers, druggists, annuitants, old officers, grooms, messengers, book-keepers, magistrates, dyers, doctors in medicine, charcoal-measurers, notaries, chasers, lawyers, stock-brokers, breeches-makers, candle-makers, snuff-dealers, booksellers, harness-makers, bedcover-makers, furbishers, water-tube-makers, wood-merchants, professors, chocolate-makers, funeral-bearers, innkeepers, cheese-merchants, skinners, furriers, chimney-sweeps, agents, architects, armourers, packers, pin-makers, gaugers, moulders in wood, vermicelli-dealers, teachers of foreign languages, needle-makers, wire-drawers, cotton-workers, marble-workers, starch-makers, rag-pickers, water-carriers, toymen, workers in stuff-manufactures, shop-boys, miners, mercers, and comb-makers.

B. In women.

1. *In all the lists.*—Wadding carders, infirmary nurses, bleachers, and garden-women.

2. *In the majority of lists.*—Dress-makers.

3. *In a single list.*—Fringe-makers, lace-makers, winders, gauze-makers, rag-pickers, cotton-workers, watch-chain-makers, calico-printers, cooks, domestic servants, annuitants, laundresses, grocers, counterpane-makers, butchers, midwives, bakers, appliers of leeches, and door-keepers.

Such is the result of the researches made to determine the question of the influence of professions upon consumption. The classification to which we have been led by statistical researches differs in many respects from that which the authors above quoted have established from their personal experience. They specify, indeed, only *four* professions, which exercise a salutary or prophylactic influence on consumption, while we have recognized the influence in a great number of cases, oftener even than the opposite effect, upon the developement of the disease. As to the professions which reckon many consumptive persons, the list furnished by authors is in many respects more accurate. They have, nevertheless, erroneously arranged among the professions favourable to the developement of consumption the conditions of advocate, dyer, founder, stocking-maker, bleacher, male and female, baker, quarrier, candlemaker, brazier, gilder, blacksmith, miner, locksmith, street-porter and wharf-porter. We have seen that these occupations appear rather to diminish than to increase the number of consumptive persons.

PART SECOND.

Inquiry into the Causes which may influence the frequency of Consumption in different professions.

The differences presented by the mode of life of the workmen of the same country may be referred to the following circumstances: The state of comfort or poverty, the continued exercise or the compulsory inaction of certain parts of the body, and, lastly, the purity or the impurity of the surrounding atmosphere. To one or other of these circumstances must be ascribed the great variations observed in the number of consumptive persons in each profession. It is true that almost all those who follow these professions are exposed to many noxious influences, and it becomes therefore difficult to distinguish the true cause of the phenomenon.

By combining, however, all the professions which present some common circumstance, we may isolate each noxious influence, and obtain a result which may be compared with the general average. Another method which leads us to the same end is the comparison of the place occupied by each profession in the general list. According as a certain number of professions are found above or below the average, it may be concluded that the frequency of pulmonary diseases is augmented or abated by the circumstance common to these different conditions.

These two methods I propose to employ in determining their influence upon the developement of consumption.

§. I. *State of comfort or indigence.*

There is a certain number of professions which can be carried on only by those classes of society who are in easy circumstances; for example, those of advocate, notary, physician, literary man, merchant, design-painter, sculptor, professor, &c. These different conditions, which amount to the number of 39 in the list of the preceding chapter, are not equally divided in the two classes above and below the average. We may estimate at three-fourths the professions which reckon few consumptive cases, while only *one-fourth* appears to be favourable to the developement of consumption. We obtain the same result by comparing the proportion of professions requiring comfortable circumstances with the total number of those which are situate above and below the average. They form *an eighth* part, or 10 in 80 above, and a *fourth part,* or 29 in 115 below. These two results are then completely accordant, to show that the more indigent classes of society are twice more accessible to consumption than the persons more elevated in the social scale. This conclusion may be regarded as so much better established, that we have seen at Geneva annuitants present only 50 consumptive persons in 1000, instead of 114, which was the general average.

§. II. *Muscular Exercise.*

The workmen of the different professions are placed in very different circumstances as to corporeal exercise. Some, such as clock-makers, copying-clerks, engravers, &c. are constantly in repose almost complete; others, though leading a sedentary life, perform, nevertheless, partial motions sufficiently distinct, for instance, turners, polishers, stocking-makers, weavers, basket-makers, &c.; others, in fine, are in a state of almost continual motion, which leaves no part of the body at rest; for instance, gardeners, agriculturists, watermen, wharf-porters, infirmary servants, &c. We have to consider, therefore, what may be the influence of these different hygienic circumstances on the frequency of pulmonary consumption.

If we compare the number of sedentary professions above and below the average, we obtain for the first result the fact, that in 80 professions situate above the average, 58, or nearly ¾ are almost completely sedentary, while only 22 or ¼ = 0.28 are active. From this it must be inferred, that the sedentary life furnishes a much greater number of consumptive cases than an active life.

The same conclusion results from the inspection of the two following tables.

First Series.

	Total number of deaths.	*Number of consumptive deaths.*
Brush-makers, . .	11	2
Jewellers, . .	138	23
Lace-makers, . .	24	3
Copying-clerks, . .	46	13
Engravers, . .	179	33
Watch-case mounters, .	370	62
Enamellers, . .	75	13
Design painters, . .	24	4
Porters, . . .	25	0
Confectioners, . .	28	1
Cutlers, . .	10	1
Binders, . . .	18	1
Book-keepers, . .	35	1
Booksellers, . .	11	0
Furriers, . . .	8	0
Women tailors, . .	148	36
Merchants, . .	476	28
Carry forward,	1626	221

	Total number of deaths.	*Number of consumptive deaths.*
Brought forward,	1626	221
Watch chain-makers, .	11	6
Grocers, . . .	21	2
Counterpane-makers, .	10	0
Sick-nurses, . .	15	1
Watch hand-makers, .	11	6
Laundresses, . .	138	20
Clock-makers, . .	24	6
Mantuamakers, . .	16	4
Teachers, . . .	21	4
Total, . .	1,893 :	270 ::
Proportion of consumptive cases in	1000 :	143

SECOND SERIES.

Sculptors, . .	6	2
Printers, . .	41	10
Polishers, . . .	35	8
Tailors, . . .	247	37
Cordwainers, . . .	376	46
Calico-manufacturers, .	125	22
File-smiths, . . .	37	4
Basket-makers, . .	9	1
Braziers, . . .	20	2
Clog-makers, . .	21	1
Chasers, . . .	14	0
Harness-makers, .	10	0
Furbishers, . .	10	0
Chocolate dealers, . .	9	0
Armourers, . .	7	0
Vermicelli dealers, . .	6	0
Wadding manufacturers, .	7	0
Calico-manufacturers, female,	15	1
Polishing women, .	24	4
Clothes-ironers, . .	73	13
	1092 :	151 ::
Proportion of consumptive in	1000 :	138

By combining the professions of the two series, we obtain for an average number of consumptive persons in the sedentary professions, 141 among 1000 deaths.

Proportion of consumptive cases in the Active Professions.

FIRST SERIES.

	Total number of deaths.	*Number of consumptive deaths.*
Joiners, . .	143	22
Paviours, . .	10	2
Street sweepers, . .	6	1
Carry forward, .	159	25

	Total number of deaths.	*Number of consumptive deaths.*
Brought forward,	159	25
Upholsterers,	52	6
Stone-cutters,	10	2
Carpenters,	176	18
Gardeners,	202	9
Tanners,	43	4
Watermen,	46	3
Bakers,	82	9
Blacksmiths,	63	8
Agriculturists,	267	19
Wood-sawyers,	99	9
Laundresses,	21	1
Total,	1220 :	113 ::
Proportion of consumptive in	1000 :	93
SECOND SERIES.		
Brokers,	15	2
Shepherds,	9	1
Draymen,	15	2
Charcoal-dealers,	12	1
Bleachers,	11	1
Slaters,	26	1
Sedan-bearers,	11	1
Grooms,	27	1
Stock-brokers,	12	0
Wood-merchants,	10	0
Hucksters,	24	1
	172 :	11 ::
Proportion of consumptive in	1000 :	64

By combining the professions of the two series, we obtain for the mean number of consumptive cases in the active professions, 89 in 1000 deaths.

Thus by comparing the number of consumptive persons in the active and sedentary professions, we observe a greater frequency of diseases of the chest among workmen who lead a very sedentary life, and this in the proportion of 89 to 141.

If we carry farther the examination, and inquire more directly into the influence of muscular exercise, we obtain the following result. Among 36 sedentary professions which allow the body a state of almost perfect quiescence, 24 or *two-thirds* are above, and 12, or *one-third* are below the medium. On the other hand, among 55 sedentary professions which require well-marked motions, 22 or *two-fifths* only are above the medium, and 33 or *three-fifths* are below that point. In other words, conditions completely sedentary produce a greater number of consumptive patients than those which require a certain degree of muscular exercise; and from this it may be inferred, that if the sedentary life augments the frequency of consumption, muscular exercise is in some degree a means of counteracting this influence.

The influence of some partial motions also deserves examination, as it is the object of very different opinions.

The majority of authors who have treated of consumption have enumerated among its causes the concussions given to the chest by the continual motions of the arms. This assertion, M. Benoiston de Chateauneuf has studied to verify by statistical researches. He has shown that the average number of consumptive persons in eight conditions, viz. weavers, gauze-makers, carpenters, joiners, locksmiths, farriers, water-bearers, sawyers, and stone-sawyers, who presented this particular circumstance, was below the general average in the proportion of 2.12, to 2.86, and he naturally concluded that thoracic concussions diminish rather than increase the frequency of consumption, and cannot, consequently, be regarded as causes of that disease.

The tables inserted at p. 142 to 144, show the influence of thoracic concussions. The second series of sedentary professions embraces those which require great motions of the arms, and the number of consumptive persons is 138 in 1000 deaths; while the professions of the first series, which do not require great motions of the arms, and consequently communicate no shocks to the chest, reckon 143 consumptive cases in 1000,—a difference scarcely appreciable, 5 in 1000. As to the comparison of the number of consumptive in the active professions, the results are as follow: The first series, which consists of professions distinguished by great motion of the arms, reckons 93 consumptive cases in 1000 deaths; and the second, which consists of professions in which the arms are in a state of comparative quiescence, reckons 64 consumptive cases in 1000 deaths. Great motion of the arms, it may therefore be inferred, appear to act in an inverse manner; viz. in diminishing the frequency of consumption in sedentary occupations, and augmenting that frequency in active professions; and from this it may be concluded that this circumstance does not deserve the importance which is by certain authors attached to it.

Constant exercise of the voice is another circumstance to which the frequency of consumption has been often ascribed. Notwithstanding all the probable strength which this reasoning appears to combine, it results, nevertheless, from statistical researches, that this influence is not so pernicious as at first sight it appears to be, and, on the contrary, it appears rather to diminish than to increase the number of consumptive cases.

Proportion of consumptive patients in professions which require constant exercise of the vocal organs.

	Total number of deaths.	*Number of consumptive persons.*
Teachers, . .	7	1
Ministers of the Protestant worship,	52	6
Carry forward,	59	7

	Total number of deaths.	*Number of consumptive persons.*
Brought forward,	59	7
Teachers of arithmetic, .	9	1
Officers, .	89	4
Musicians, . .	27	1
Advocates, . .	12	1
Professors, . .	37	1
Female teachers, .	21	4
	254 :	19 ::
Proportion of consumptive in	1000 :	75

This table shows that the exercise of the voice is not an unfavourable circumstance in reference to consumption, and that, if there be some delicate individuals who experience troublesome effects from a constant use of the vocal organs, this circumstance is in general more advantageous than hurtful, and diminishes rather than increases the frequency of consumption. The mean number of victims to this disease being indeed 114 in 1000, the preceding table presents only 75. This conclusion may be regarded as so much better established, that it is in all respects agreeable to that which M. Benoiston de Chateauneauf has deduced from facts examined by himself.*

The incurvated attitude required by certain professions has been generally considered as a frequent cause of consumption.

This opinion M. Benoiston confirms. He shows that workmen constantly bent become more frequently consumptive than others, in the proportion of 4.84 to 2.86, which is the general average.

The documents collected at Geneva lead to the same result, as is shown by the following table.

Proportion of Consumptive persons in professions requiring an incurvated position.

First Series.

	Total number of deaths.	*Number of consumptive cases.*
Tailors, . .	247	37
Copying clerks, .	46	13
Cordwainers, . .	376	46
Engravers, . .	179	33
Basket-makers, . .	9	1
Clock-makers, . .	1073	139
Clog-makers, . .	21	1
Book-keepers, .	35	1
Persons employed in courts,	67	4
	2053	275

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* Annales d'Hygiene, July 1831, p. 37.

SECOND SERIES.

	Total number of deaths.	Number of consumptive cases.
Hatters,	38	9
Tanners,	43	4
Chamois-workers,	13	1
Braziers,	20	2
	114	16
Sawyers,	99	9
Carpenters,	176	18
Gardeners,	202	9
Bleachers,	39	1
Laundresses,	21	1
	537	38

Upon combining the professions of the three lists, we see that the workmen confined to a bent position reckon 122 consumptive persons among 100 deaths, that is to say, 0.08, or eight hundredths more than the general average 0.114. It is, however, requisite to distinguish the professions requiring an incurvated position, but which take a good deal of muscular exercise, (second and third list,) from those which, while they incurvate the body, leave it in a state of quiescence almost perfect. The second and third reckon only few consumptive cases, 83 in 1000, while the first list reckons more than the general average, 134 in 1000; and from this we may conclude, that if the position of the body habitually inclined forwards, performs any part in the production of consumption, this influence is more than corrected by the muscular exercise. This conclusion is further confirmed by the rarity of consumption among tanners, gardeners, bleaching and washing-women, who are constantly bent at their work. The great frequency of consumption in copying-clerks (280 in 1000) has been imputed to the cause now under consideration; but this fact may be explained by the absence of muscular exercise, since book-keepers, who like clerks are constantly stooping, rarely suffer from this disease, and further, cordwainers and tailors, who are in a position more bent than clerks, are less subject to the disease by one-half. In conclusion, though theory leads us to consider constraint in the functions of the lungs caused by the position of certain classes of workmen, as a frequent cause of consumption, this circumstance appears to exercise only a very secondary influence, and one which is more than counterbalanced by constant muscular exercise.

§. III. *Influence of the purity or impurity of the surrounding atmosphere.*

Of all the causes to which the workmen of different trades are exposed, none is so important as that of the atmosphere, since it acts directly on the lungs, the seat of consumption. Great differences are also remarked in the number of consumptive persons among workmen, according as they are exposed to air more or less pure, hot or cold, moist or dry. These different circumstances we must consider, in order to form a just estimate of their degree of action in the developement of consumption.

The trades may be divided into two classes, according as they are carried on in the open air or in workshops. Among 58 trades carried on in the open air, 18 or 31 *per cent.* only are above the average, and 40 or 69 *per cent.* are below it; from which it results that workmen surrounded by air constantly renewed are rarely attacked with consumption. The confirmation of this fact we further obtain by comparing the mortality of professions carried on in the open air, with those of workmen shut up in workshops; for we find 138 consumptive cases among 1000 deaths in the latter class, and only 73 in 1000 in the first;* in other words, consumption is twice more frequent among workmen shut up in workshops than among those who work in the open air.

The same circumstances influence the frequency of consumption in workmen pursuing their avocations in workshops. If indeed we distinguish these persons into two classes, according as they work in large well aired places, or in close narrow shops, we perceive that the frequency of consumption is not the same. Trades carried on in large workshops are in the minority (27 in 79) above the medium, and in the majority (52 in 79) below the medium. The contrary result is observed in those trades carried on in small ill-aired places. There are in the majority above (35 in 67,) and in the minority below (32 in 67) the average. The corrupted air of the localities may, therefore, be viewed as the cause of the large proportion of consumptive cases which is observed in certain trades, while pure and frequently renewed air is an excellent preservative.

The salubrity of the atmosphere by which workmen are surrounded is often altered by foreign bodies, the contact of which with the lungs must excercise a remarkable influence over the developement of pulmonary consumption. These foreign bodies may be either dissolved in the atmosphere or simply suspended in the air.

1. *Bodies dissolved in the atmosphere.* These proceed from vapours or emanations. The principal are aqueous, acid, alcoholic or metallic vapours, and animal and vegetable emanations.

Watery vapours. A certain number of trades can be carried on only in the midst of a moist atmosphere; such as those of tanner, bleacher and bleaching-women, waterman, weaver, water-carrier and washerwoman. Now of all these professions not one can be classed below the medium, that is, among those which reckon only a small number of consumptive cases. The uniformity of this result is so much more remarkable, that theory would have led to a contrary opinion. Observation, indeed, having demonstrated, that cold moist climates are those in which consumption commits its chief ravages, it would have been natural to suppose that in a cold variable climate like that of Geneva, the moisture of the surrounding atmosphere must have increased rather than diminished the frequency of this disease; and nevertheless the average number of those, who in trades [illegible] surrounded with moisture, are attacked with consumption, is inferior more than one-half to the general average.

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* This result is derived from the table p. 144, by throwing aside the joiners, carpenters, tanners, bakers, and blacksmiths, who work partly in the open air, and partly in shops.

Professions surrounded with watery emanations.

	Total number of deaths.	*Number of consumptive cases.*
Weavers, - -	41	2
Dyers, - - -	25	0
Tanners, - -	43	4
Watermen, - -	46	3
Bleachers, - -	11	1
Bleaching-women, - -	39	1
Washerwomen, - -	21	1
	226	12
Proportion of consumptive cases in 1000		53

From this table it results that the frequency of consumption with workmen exposed to watery vapour is very inconsiderable at Geneva. M. Benoiston de Chateauneuf has come to an opposite conclusion as to Paris; but which does not destroy our conclusion, since it is founded only on the great number of washerwomen who die of consumption in the hospitals of the city; for there are many causes independent of moisture which contribute to render the washerwomen of Paris more subject than others to contract diseases of the chest.

We experience more difficulty in assigning exactly the influence of a hot dry atmosphere, because there is almost no occupation in which this circumstance is in any degree violated. The following table, however, may present some interest.

Proportion of consumptive persons in professions surrounded by a hot dry atmosphere.

	Total number of deaths.	*Number of consumptive cases.*
Tool-makers, . .	22	6
Enamellers, . .	75	13
File-smiths, . .	37	4
Founders, (54) . .	47	0
Blacksmiths, . . .	63	8
	244	31

The result of this table is, that workmen surrounded by a hot dry atmosphere yield more readily than other workmen,—in the proportion of 127 to 114; from which it may be inferred, that, if a moist atmosphere is a preservative against consumption, so hot dry air may be considered as a cause of this disease. This conclusion is quite accordant with general experience, which regards dry air as irritating and a moist atmosphere as mild for respiring and facilitating the play of the lungs. It is probable that the frequency of consumption among certain workmen, as clock-makers, jewellers, watchcase mounters, goldsmiths, &c. depends partly on the high temperature of their choffers, which dries and rarifies the air of their workshops.

Animal emanations.—The influence of an atmosphere loaded with animal emanations appears to be equally favourable as moist air, as may be shown by the following table.

Proportion of consumptive persons in occupations surrounded with animal emanations.

	Total number of deaths.	*Number of consumptive cases.*
Butchers, . .	77	5
Tanners, . .	43	4
Chamois leather workers, .	13	1
Candlemakers, .	11	0
Sick-tenders, . .	28	1
Butcher-women, . .	10	0
	182 —:	11::

Proportion of consumptive in 1000 : 60

From this table it results that workmen surrounded by animal emanations are about twice less liable than others to contract pulmonary consumption. The exact proportion is 60 to 114.

Vegetable emanations surrounding workmen may be referred to two very distinct classes. The one proceed from plants still attached to the soil; while the others are the result of preparations which these substances have been made to undergo.

Agriculturists, gardeners, and florists are constantly surrounded with emanations of the first kind; and these we see, instead of suffering, enjoy, on the contrary, robust health. Agricultural workmen, though exposed to many privations, rarely become the victims of consumption; (7 per cent.) Gardeners are still less subject than agricultural workmen to this disease, since we reckon only 4 consumptive persons among 100 deaths. We may therefore regard air loaded with emanations of living plants as a preservative against consumption.

It is probably somewhat different with the vapours proceeding from the fermentations of vegetable substances. At least vat-men (0.12,) cellar-butlers (0.11,) and bakers (0.11,) all of whom are more or less exposed to alcoholic vapours, are pretty often the victims of consumption. It is unnecessary, however, to attach great importance to the influence of alcoholic vapours; since among the different workmen exposed to this influence, the frequency of the disease little or not at all exceeds the average frequency. This is so much more true, that among starch-makers, who respire air loaded with the products of acid and alcoholic fermentation, the number of consumptive persons is below the average (being 1.02 instead of 28.6.)

Another species of emanations which may be referred to the class now under review is that of *varnish*. The volatile vegetable substances, such as turpentine and the drying oils, exercise a very unfavourable influence on the health of the workmen. Among 65 varnish-painters cut off at Geneva, 24 or 37 per cent. have died of pulmonary consumption. This large proportion appears to depend only on the emanations of the turpentine and drying oils which enter into the composition of the varnishes, as these workmen are forced neither to observe complete quiescence of their muscles, nor a sedentary life, and still less an incurvated posture. The design-painters, though exposed to the same influences, become less frequently the victims of pulmonary consumption than the varnishers, because they are not obliged like the latter to be in some degree saturated with noxious emanations, as they carefully shut their shops to prevent the dust from sticking to the varnish.

Mineral Emanations.—These are of two very different kinds; the acid or permanently gaseous vapours, and the metallic vapours. The different gases which arise from charcoal in combustion may at length produce disorganization of the lungs. Such at least appears to be the origin of consumption in linen ironers, (18 per cent.) who are not exposed to any deleterious influence. The same cause probably augments the number of consumptive persons among enamellers (17 per cent.,) tinsmiths (23 per cent.,) spring-makers (17 per cent.,) blacksmiths (13 per cent.,) and tool-makers (27 per cent.)

The mineral acids are often employed in the arts, and consequently impregnate the air of workshops. The nitric acid is employed by hatters, gilders, assayers, and goldsmiths. Of these four trades one only is situate above the average; the others reckon only a small number of consumptive persons; and from this results some probability that nitrous vapours are not so irritating in reality as in appearance. As to the sulphureous and muriatic vapours, statistical researches teach nothing definite on their noxious qualities; and the same may be said of chlorine gas, which is at present proposed as an excellent remedy against pulmonary consumption. The only fact which appears certain, and upon which we possess documents, is the rarity of consumption among the workmen employed in the manufacture of chlorine. M. Gannal, who first employed chlorine as a remedy for consumption, was led to this measure by the recovery of a consumptive patient who was working in a manufactory of chlorine. I have had occasion myself to confirm the statement as to the harmlessness of this gas in a great manufactory of chloride of lime. The only inconvenience felt by a workman who had been employed in it for more than twelve years, is a transitory uneasiness, when one of the retorts from which the chlorine is disengaged happens to break and to diffuse vapours abundantly in the manufactory.

The metallic vapours which in the greatest degree vitiate the air in workshops are those which are evolved from lead, mercury arsenic, and antimony.

Hat-makers and gilders are the workmen most exposed to mercurial emanations. Among the former, the great frequency of consumption may depend as much on the nitrous vapours and foreign bodies suspended in the air as on mercurial emanations. Gilders, who are more especially exposed to the action of the latter, appear to experience from it no marked effect. According to the results obtained at Paris by M. Benoiston, gilders and gilding women very frequently sink under consumption; but according to the researches made by me at Geneva, this disease is rather rare among the same class of workmen. This difference may appear astonishing, and might diminish confidence in statistical researches; nevertheless, as the processes of gilding are very varied, it is possible that different processes may be employed at Geneva from those pursued at Paris. Lastly, it may also happen that the frequency of consumption among the Paris gilders may depend on their mode of life. It is certain that I have often had occasion to observe the mercurial trembling among the gilders of Geneva, and that, consequently, no doubt can be entertained on the inhalation of the mercurial vapours; so that if these vapours were as hurtful as is generally believed, consumption would become equally frequent among the Geneva as among the Paris workmen.

This conclusion would appear to be contrary to that which may be deduced from the fact observed in the ship Triumph in 1810. This vessel had a cargo of mercury, which escaped in every crevice of the hold. Besides the ptyalism and gangrenous sores observed in consequence of this accident, it was observed that the mercurial vapours were very hurtful to those who had any disposition to become consumptive. Three men, who had never been unwell, or who were in good health before breathing the mercurial vapours, died phthisical in a very short time; a fourth recovered from *pneumonia;* and a fifth, who had never had any disease of the breast, was left at Gibraltar in a state of confirmed consumption. Upon the whole, new researches are requisite to determine the influence of mercurial vapours on the formation of consumption. At present we can only consider these emanations as very hurtful to persons whose chest is delicate, but as inadequate to cause consumption in robust workmen who live in hygienic species of life.

The influence of emanations of lead in the developement of consumption it would appear to be easy to determine; considering the great number of workmen who use this mineral, and nevertheless the great uncertainty of the facts hitherto collected. Thus, though we observed a considerable number of consumptive persons among varnishers, (37 per cent.), printers, (24 per cent.), and potters, (14 per cent.), it is difficult to assign exactly the influence of lead in these different results. Their conformity, nevertheless, might make the action be supposed to be deleterious, and require it to be studied by persons placed in circumstances favourable to determine the question. The same uncertainty is equally observed as to the influence of the vapours of arsenic, antimony, and copper. M. Mahon, (Med. Leg. Tome ii. p. 329,) and M. Dubois of Rochefort (Matiere Medicale, p. 171,) have specified arsenical vapours as very hurtful to the lungs, and think that the trades of stone-ware glazer, dyer, and founder, ought to produce many consumptive cases. This opinion, however, is not confirmed by statistical researches; for we see that dyers and founders almost never become the prey of this disease. It is nevertheless possible that its frequency among enamellers, (17 per cent.) depends partly on the arsenical vapours which they use when melting, and which, so to speak, they might easily evade. The antimonial vapours which M. Orfila represents to be a cause of *hemoptysis* and consumption, do not appear to be hurtful, since among 47 deaths of founders not one consumptive case is found.

The preceding facts seem to demonstrate the proposition that metallic emanations do not direct their noxious influence to the lungs, and that, notwithstanding the remarkable action which they exert on the nervous system, and the debility which they at length produce, the production of consumption is not one of their immediate or even consecutive effects.

2. *Bodies suspended in the atmosphere.*—Bodies simply suspended in the atmosphere form another class of detrimental agents to the functions of the lungs. Very different from the vapours which, by means of pulmonary absorption, modify the whole animal economy, these bodies, which are not intimately united with the air, exercise an action merely mechanical, the intensity of which depends more on their physical qualities than on their chemical nature. Their influence is further proportioned to their degree of subdivision, to their hardness, and their specific gravity.

The trades which expose the workmen to breathe air loaded with foreign bodies may be divided into two classes, according as the bodies are large and coarse, or very minutely divided.

Proportion of consumptive persons among workmen exposed to breathe air loaded with foreign, bodies.

1. Large coarse particles.

	Total number of deaths.	*Number of consumptive cases.*
Sculptors, . .	6	2
Stone-cutters, . .	10	2
Masons, . .	124	12
Plasterers, . .	33	7
Terrass-makers, .	6	1
Hatters, . .	38	9
Coverlet-weavers, .	10	0
Furriers, . .	8	0
Brush-makers, . .	11	2
Harness-makers, .	10	0
Mattress-makers, .	20	3
	276 :	38 ::
Proportion of consumptive persons in	1000 :	137

2. Particles minutely subdivided,

	Total number of deaths.	*Number of consumptive cases.*
Millers,	27	4
Wigmakers,	94	11
Paviours,	10	2
Street-sweepers,	6	1
Charcoal-dealers,	12	1
Bakers,	82	9
Cutlers,	10	1
Charcoal-meters,	15	0
Chimney-sweeps,	8	0
Pinmakers,	7	0
Polishers,	35	8
Watch-hand-makers,	11	6
Polishing women,	58	14
	375 :	57 ::
Proportion of consumptive cases in	1000 :	152

Inspection of these two tables shows, that air loaded with coarse particles is less hurtful than air loaded with very minutely divided particles, in the proportion 137 to 152. M. Benoiston has obtained a similar result as to Paris. The same trades which have enabled us to form the previous tables have given him as the mean number of consumptive cases, 2.45, as to the workmen exposed to breathe air loaded with coarse particles; and from this it appears that both at Paris and Geneva, the inhalation of very minutely divided dust is a more frequent cause of consumption than that of coarse particles. It is not difficult to perceive the explanation of this fact in the obstacles exercised by coarse particles in penetrating to the lung, while very fine dust may easily reach the remote ramifications of the bronchial tubes.

The hardness of the particles suspended in the air furnishes some interesting results as to consumption. The following table, extracted from the previous one, shows the variations observed in the relative frequency of this disease in workmen breathing air loaded with particles detached from soft, hard, or very hard bodies.

Proportion of consumptive persons among workmen surrounded with air loaded with foreign bodies.

Dust detached from	*Proportion of consumpt. cases.* *Geneva.*	 *Paris.*
Soft unctuous bodies,	127	280
Hard bodies,	120	210
Very hard bodies,	290	525

From this it may be inferred that the dust detached from very hard bodies causes a much greater number of consumptive persons, than the dust detached from soft bodies, or those of ordinary hardness. And as to the two last classes, the greatest frequency of the disease is observed in workmen who breathe air loaded with particles of inconsiderable hardness. This difference would have at first appeared to me to be capable of being explained by the specific gravity of the particles diffused in the atmosphere; but the following shows that the influence of this circumstance is very secondary.

Proportion of consumptive patients among the workmen exposed to breathe air loaded with foreign bodies.

1. Heavy Dust.

	Geneva.		*Paris.*	
	Total No. of deaths.	*No. of consumpt. cases.*	*Total No. of deaths.*	*No. of consumpt. cases.*
Polishers, .	35	8	270	12
Polishing-women,	38	14	548	21
Watch hand-makers,	11	6		
Cutlers, .	10	1		
Pin-makers, .	7	0		
Lapidaries, .			244	15
Paviours, .	10	2		
Street-sweepers, .	6	1		
Sculptors, .	6	2		
Stone-hewers, .	10	2	551	5
Masons, .	124	12	4071	90
Marble-cutters, .			162	2
Plasterers, .	33	7	158	4
Terrass-makers, .	6	1		
	316	56	6004	149
Proportion of consumptive persons in	1000 :	177	248	
2. Light Dust.				
Charcoal dealers, .	15	1	374	14
Charcoal meters,	11	0		
Chimney-sweeps;	8	0		
Rag-pickers, .			590	5
Brush-makers, .	11	2	283	10
Harness-makers, .	10	0		
Mattress-makers, .	20	3		
Millers, . .	27	4		
Bakers, . .	82	9		
Wig-makers, .	94	11		
Starch-makers, . .			98	1
Feather-dressers,			39	3
Hatters, . .	38	9	983	47
Coverlet-weavers, .	10	0		
Furriers, . .	8	0		
	335	39	2367	80
Proportion of consumptive cases in	1000	116	3.36 per cent.	

Inspection of these two tables shows a greater number of consumptive cases at Geneva, and a smaller number at Paris, among the workmen exposed to breath heavy powders, while the contrary is observed as to light powders; and from this it may be concluded that the specific gravity of pulverulent substances does not operate in a very sensible manner in the developement of consumption.

If further, we compare the influence of mineral, vegetable, and animal powders, we obtain for Geneva the following results.

1. Mineral Powders.

	Total number of deaths.	*Number of consumptive cases.*
Paviours,	10	2
Street-sweepers,	6	1
Cutlers,	10	1
Pin-makers,	7	0
Polishers,	35	8
Polishing-women,	58	14
Watch-hand-makers,	11	6
Sculptors,	6	2
Stone-cutters,	10	2
Masons,	124	12
Plasterers,	33	7
Terrace-makers,	6	1
	316	56
Proportion of consumptive cases in	1000	177

2. Vegetable Powders.

Millers,	27	4
Wig-makers,	94	11
Charcoal-dealers,	12	1
Bakers,	82	9
Charcoal-meters,	15	0
Chimney-sweeps,	8	0
	238 :	25 ::
Proportion of consumptive cases in	1000 :	105

3. Animal Powders.

Hatters,	38	9
Coverlet-makers,	10	0
Furriers,	8	0
Brush-makers,	11	2
Harness makers,	10	0
Mattress-makers,	20	5
	97 :	14 ::
Proportion of consumptive cases in	1000 :	144

From this table it results that mineral powders are the most hurtful to the lungs; next to these come animal powders; and lastly, vegetable powders. The researches made by M. Benoiston in the hospitals of Paris do not accord with the result which I have now stated. He found that animal powders were the most hurtful; that vegetable powders came in the second rank, in this respect; and that mineral powders were the least injurious of the three. From this the inference must be, that this question is to be considered as still undecided; remembering, nevertheless, that the method employed at Geneva is much better calculated than that adopted by M. Benoiston for giving exact results.

In summing up the preceding facts, we arrive at the conclusion, that the powders most hurtful to the lungs are those which proceed from very hard bodies, and are reduced to an impalpable powder. This result of statistical researches is quite in accordance with the opinion of the majority of authors who have investigated this subject. They have indeed specified the inhalation of emery-dust, steel-dust, and flint-dust, as a frequent cause of consumption.

The workmen who employ emery, the hardest of all the substances used in the arts, are also the first in the order of frequency of consumption. Thus the watch-hand makers present 55 per cent. and the steel-polishers furnish 35 per cent. of consumptive cases,

Almost all the workmen employed at Sheffield in polishing steel become the prey of pulmonary consumption. It has been observed that in 2500 persons employed in this department, scarcely 35 reach the age of 50 years, and scarcely 70 that of 45 years; while the majority die before the 36th year. Dr Johnston remarked in 1799, the great frequency of consumption among the workmen occupied in pointing needles on ground-stones;* and recently, Dr Knight of Sheffield, published a new memoir on the same subject, and has added new facts to those already known.† He remarks that no polisher of steel-forks reaches his 36th year. Among 250 steel-polishers, admitted into the dispensary of Sheffield, 154 had diseases of the chest, and 13 died within the year; while of 250 workmen pursuing other professions than polishing, 56 only had diseases of the lungs, and only one died within the year. The age of 827 of these patients deserves to be remarked.

	Steel-grinders.	*Other trades.*
Above 30 years	125	140
35	83	118
40	40	92
45	24	70
50	10	56
55	4	34
60	1	19
	287	539

This table shows how much the steel grinding abridges the lives of the workmen engaged in this occupation. Numerous attempts have been made to render this operation less injurious; but all have been inadequate, and the grinding of steel is at the present moment as hurtful to the health of the workmen as it was thirty years ago.

Next to particles of steel and emery, the hardest are those of flint-dust, which also exercise a very disagreeable influence upon the lungs. In the manufactures of porcelain, where flint was ground by means of granite mill-stones, the majority of the workmen employed in this process fell a prey to consumption; but since the method of bruising that substance with water has been introduced, this disagreeable result has ceased to be observed as to them.

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* Memoirs of the Medical Society Lond. Vol. v.

† North of England Medical and Surgical Journal, August 1830.

In the circle of Romorantin, and in several other localities where gun-flints are cut, a great number of workmen became phthisical in consequence of the inhalation of the siliceous particles. Sandstone hewers are in the same circumstances; and Dr Young observed that those of the quarry of Waldshut almost all became the prey of pulmonary consumption. Dr Alison has made the same observation on the sandstone hewers in the neighbourhood of Edinburgh, where it is rare for them to attain the age of 50 years. Leblanc has written a monography on the consumption of the sandstone hewers, which, in consequence of its frequency in the quarries of Saint Roch, has been denominated the *disease of Saint Roch*. This result of general experience is confirmed by the fact, that lapidaries very frequently fall victims to pulmonary consumption, being 6.14 per cent. instead of 286, which is the general average.

In the same situation are the workmen exposed to breathe calcareous particles. Thus plasterers reckon 21 per cent. of consumptive persons,—about double the general average. Masons, street-sweepers, and stone-cutters reckon also a greater number of consumptive persons than the general medium.

If from hard heavy powders we pass to light filamentous substances we find them not less irritating to the lungs. The workmen employed in beating cotton frequently sink under diseases of the chest. The influence of this occupation appeared even so hurtful to some philanthropic individuals at Manchester, that they solicited a parliamentary inquiry, the result of which was the adoption of a machine or ventilator, by means of which all the threads scattered in the atmosphere are carried out by a current of air. Notwithstanding all these precautions the attempt to correct the insalubrity of these manufactories has not yet been successful, and the workmen employed in them are often obliged to interrupt their work, if they wish to escape an incurable disease. The influence of these filaments suspended in the air is particularly felt by feather-dressers, coverlet-weavers, and hatters; and these different workmen have presented at Paris the greatest number of consumptive persons. The noxious influence of these different bodies depends not only on their specific lightness, which often brings them in contact with the lungs, but also on their filamentous shape and their flexibility, which allows them to adapt themselves to the air-tubes, and to penetrate to a considerable depth in the *bronchi*.

According to the results obtained at Geneva the vegetable powders, such as flower and starch, appear to be less injurious to the lungs. It is probable that the comparative harmlessness of these impalpable powders depends on the facility with which they mingle with the saliva and form a paste, the contact of which has nothing irritating to the air-passages.

Reviewing, meanwhile, the preceding facts we arrive at the following conclusions.

1. The circumstances which multiply cases of consumption are; indigence, a sedentary life, and the absence of muscular exercise, the concussions of the workships, the bent posture, the impure air of shops and manufactories, the inhalation of certain mineral or vegetable vapours, and lastly, air loaded with powders, coarse or impalpable, or with bodies light, elastic, and filamentous.

2. The circumstances which exercise a preservative influence are, opulence, an active life spent in the open air, the regular exercise of all parts of the body, the inhalation of aqueous vapours, or of animal or vegetable emanations.

But it is not enough to specify these different circumstances. It is requisite to estimate the degree of influence of each in the production of consumption. The following table, which gives the mean number of consumptive persons among the workmen exposed to these several influences, will serve to determine this question.

Mean number of Consumptive cases 114 per 1000.

	1. Noxious Influences.	
1.	Mineral and vegetable emanations, .	0.176
2.	Various sorts of powders or dust, .	0.145
3.	Sedentary life, . . .	0.140
4.	Life spent in shops or manufactories, .	0.138
5.	Hot dry air, . . .	0.127
6.	Bent posture, . . .	0.122
9,	Motions of the arms causing shocks of the chest,	0.116
	2. Preservative Influences.	
1.	Active Life (muscular exercise,) .	0.089
2.	Exercise of the voice, : ,	0.075
3.	Life spent in the open air, .	0.073
4.	Animal emanations, . . .	0.060
5.	Aqueous vapours, . . .	0.053

This table shows that, of all the circumstances enumerated in the memoir, the most hurtful to the lungs is the inhalation of sundry mineral and vegetable emanations, which vitiate the air of localities. Next to vapours, but at a great interval, come bodies floating in the air. Next to atmospherical impurity the most active causes in the developement of consumption are the want of muscular exercise, and habitual residence in manufactories. In the fifth place comes hot dry air as a productive cause of consumption. Lastly, the trades which appear to operate with least activity, and to increase in a very small degree the standard number of consumptive cases, are those which require a bent position or great motion of the arms; but the two last circumstances deserve not the importance attached to them by some authors; since they would increase only at the rate of from 0.02 to 0.08, the mean number of consumptive cases.

Of circumstances which exercise a prophylactic influence over consumption, the most important is the moisture of the surrounding atmosphere; and next to these come animal emanations, which greatly diminish the frequency of consumption. Less conspicuous, but not less undoubted, are the prophylactic influence of muscular exercise and the open air, the latter of which appears to diminish by one-third the frequency of consumption in the professions which enjoy its advantages.

Application of the preceding Facts.

The facts contained in this memoir are susceptible of different applications, hygienic and therapeutic; a few of which only I shall mention.

1. Some authors have considered consumption as a disease purely local, and have thought that it might be cured by remedies, the action of which was principally directed to the lungs. This opinion is not confirmed by statistical researches. If, indeed, we divide the circumstances calculated to influence the frequency of consumption according as their action is general, or operates particularly on the organ of respiration, we obtain the following result: The influences which modify the entire economy, for instance sedentary life, want of exercise, and the close air of manufactories, produce 140 consumptive cases in 1000, while the circumstances, the action of which is restricted to the lungs, such as the inhalation of hot air and different vapours, and pulverulent substances, curved position and thoracic concussions, present on a medium only 137 consumptive cases in 1000, or $13\frac{7}{10}$ per cent; and from this it ought to be inferred that consumption is a general disease not confined to the lungs, and that, consequently, in attempting a cure, it is necessary to begin by modifying the whole economy.

2. The rarity of consumption among sick nurses and even infirmary servants shows how little foundation there is for the opinion, that the disease is contagious. We may affirm that, at least at Geneva, Paris, Vienna, and Hamburg, it possesses no contagious properties; since the infirmary attendants who breathe an atmosphere loaded with the emanations of many consumptive individuals are seldom attacked by the disease. It may not be the same in the southern countries of Europe, though on this point we as yet possess no very positive fact.

3. The impurity of the air of manufactories being one of the most pernicious circumstances to the health of the workmen, it is important to rectify it, as far as may be practicable, either by means of the call-stove of M. D'Arcet, or by any other good system of ventilation. There are farther certain localities which cannot be ventilated without damage to the work, such as those of feather-dressers, varnishers, enamellers, &c; and in such circumstances it is of the utmost importance for these different workmen never to remain longer than a certain number of hours, and to breathe at least for some instants pure air.

The influence of pure air is so important to the functions of the lungs, that several physicians have made it the basis of the curative treatment of consumption. They cause patients to take what they denominate an *air bath*; that is to say, they chuse a place well-ventilated, dry, and sheltered from the north winds, to place the patients in it during the whole day, and allow them to quit it only in the evening or in bad weather. The utility of this treatment seems completely confirmed by statistical researches.

4. We have seen that the moisture of the atmosphere exercises a very remarkable influence on the diseases of the chest, the number of which it diminishes. From this it is evident, that, in the selec-

tion of a climate favourable to consumptive persons, moisture ought to be taken into consideration, and that consequently the moist climates of Pisa and Rome ought to be preferred to the less mild climate of Nice and Naples; and as to the dry pure sky of Montpellier, of Provence, and especially of Marseilles, it cannot fail to be hurtful to consumptive invalids, and ought to be obliterated from the list of stations favourable to this class of patients.

Another practical consequence resulting from the researches contained in this memoir, is the utility of aqueous vapours in manufactories, the temperature of which is elevated. Enamellers, smiths, tool-makers, and founders, ought to have constantly near their furnaces a vessel of water, the evaporation of which would destroy the influence of the hot dry air. Clock-makers, watchcase mounters, and all the workmen who ply their trades in small workshops strongly heated by means of choffers, ought to observe the same precaution, and to temper the air by as much aqueous vapour as may be compatible with the perfection of their work.

5. As the want of muscular exercise is a frequent cause of consumption, it is evident that sedentary workmen ought as much as possible to take daily exercise in the open air, taking care to move the muscles, which during their work are restricted to a compulsory quiescence; and if it were possible to carry this measure into workshops, it is probable that the workmen would experience not only an advantageous result as to consumptive tendency, but that they would find their health improve, and get rid of those nervous affections which are the concomitants of sedentary professions. Perhaps the practice adopted by cordwainers and tailors, of devoting two days every week to walking and recreation, diminishes among them the prevalence of consumption, to which their mode of life seems otherwise favourable.

6. Lastly. The last and most important practical consequence to which I am desirous to fix attention, is the advantage which certain workmen might derive from a change of trade, as soon as they began to experience any symptoms of this disease. Workmen who neither have means of enjoying rest nor of changing climate, still less of devoting all their time to the care of their health, and who, if they continued to pursue the insalubrious occupation which they have chosen would die of consumption, will experience the most advantageous effects from changing their occupation for one less dangerous. Thus, strong robust men may assume the occupation of gardener, husbandman, bleacher, waterman, butcher, tanner, wharf-porter, &c. Those, whose constitution may be too delicate for occupations so laborious, might become confectioners, cart-wrights, slaters, braziers, binders, dyers, grooms, &c. They may in short chuse one of those trades which are placed above the mean. The same advice may be given to young persons who are threatened with being consumptive, either from original feebleness of constitution, or from hereditary influence.

Notes to references in the foregoing paper.

(1.) *Patissier*, Traité des Maladies des Artisans. (2.) *Ramazzini* de Morbis Artificum, and *Fourcroy*, Encyclopedie Methodique. (3.) *Johnstone* on a new Species of Phthisis among Needle-pointers, Mem. of Lond. Med. Society, Vol. v. *Wood*, Transactions of Society for Encouragement of Arts and Manufactures, Vol. xxix. (4.) *Fourcroy*, Encycl. Meth. (5.) *Desbois de Rochefort*, Matiere Medicale. *Mahon*, Medecine Legale. (6.) *Patissier*, loc. cit. (7.) *Bonet* and *Patissier*. (8.) *Macquart*, Dictionnaire pour la Conservation de l'homme. *Maygrier*, Dict. des Sciences Med. Phthisie. (9.) *Ramazzini*. (10.) *Patissier*. (11.) *Ramazzini, Morgagni, Fourcroy*, and *Macquart*. (12.) *Morgagni*. (13.) *Ramazzini*., *Leblanc*, Precis d'Operations de Chirurgie. *Young* on Consumption. *Alison*, Edinburgh Medico-Chirurgical Transactions. *Patissier, Alibert*. (14.) *Brieude*, Mem. de la Societé Roy. de Medecine 1783. (15.) *Macquart, Gosse*, Mem. Couronné par l'Acad. des Sciences in 1785. Tenon, Mem. de l'Institut, Tome vii. *Chaussier, Patissier*, &c. (16.) *Skragge. Morbi Artificum*. Th. Upsalae, 1764. *Fourcroy*, loc. cit. (17.) *Patissier*. (18.) *Fourcroy*. (19.) Id. id. (20.) *Ramazzini*. (21.) Id. *Skragge*. (22.) *Ramazzini. Fourcroy, Gosse*, Mem, &c. 1783. (23.) *Patissier*. (24.) *Johnston*, loc. cit. (25.) *Patissier*. (26.) *Macquart*. (27.) *Brieude*, loc. cit. (28.) *Ramazzini*. (29.) *Macquart*. (30.) *Patissier, Cadet de Gassicourt*. (31.) *Brieude*. (32.) *Ramazzini*. (33.) *Walker* of Leeds, Mem. Med. Society of London, Vol. ii. (34.) *Patissier*. (35.) *Ramazzini, Morgagni, Macquart, Patissier*. (36.) *Patissier*. (37.) Id. id. (38.) *Ramazzini*. (39.) Preceptes de Santé, ou introduction au Dictionnaire de Santé, 1772. (40.) *Macquart*. (41.) *Foderé*. (42.) *Patissier*. (43.) *Stoll*, Med. Pratique. (44.) *Brieude, Patissier*. (45.) *Ramazzini*. (46.) *Beddoes* on Consumption and on Hygeia. *Patissier*. (47.) *Clapier*, Journ. de Med. Tome xviii. *Patissier*. (48.) *Beddoes* on Consumption, &c. (49.) *Dodds*, Lond. Med. Gaz., March 1829.

(50.) p. 135. Bulletin de la Societé Med. d'Emulation, Janvier 1822, page 13, et suiv.

(51.) p. 135. In all the subsequent enumerations, the terms *above the mean or average* is synonymous with *favourable to the production of consumption*. It is further necessary to observe, that the professions or trades are uniformly arranged according to the order of the frequency of consumption in them,—those which reckon the greatest number being placed first.

(52.) p. 138. From the language masters to the founders, there were no deaths from pulmonary consumption, though the number of deaths varies from 47 to 6.

(53.) p. 140. The first eight trades in this list may be regarded as belonging to the first class, viz. to that which reckons a number of consumptive cases above the general mean. They are indeed placed above the mean in the Geneva list, which may be considered as the most exact. The following seven, though below the mean in the same list, are really above it also.

(54.) Though it must be observed that in 47 deaths of founders no consumptive case is found, it may be added that the air of their workshops is kept humid by the water employed in completing their work, or quenching their softened metals.

PART II.

CRITICAL ANALYSIS.

Art I.—*Recherches Experimentales, &c. Experimental Inquiries into the Functions of the Ganglionic System of Nerves and their application to Pathology.* By J. L. Brachet, Physician to the Hotel Dieu and Prison of Lyons, &c.—A work which in 1826 obtained the Montyon prize. 8vo. Paris, 1830. Pp. 447.

The ganglionic system of nerves has long engaged the attention of anatomists and physiologists, to whom its origin, distribution, structure, and functions have afforded the subject of many a keen and fruitless discussion. Centuries elapsed before its connection with the cerebral nerves was correctly understood, and all the zeal and industry of the elder anatomists enabled them to trace but few of its communications with the cerebro-spinal system.

Galen [*] considered the sympathetic to be a branch of what he denominated the sixth pair, the eighth of Willis, or the pneumogastric of modern anatomists; and this view he was no doubt led to adopt by finding in several animals both nerves inclosed in the same sheath. The doctrine of Galen continued to be taught in the schools till, in 1522, Alexander Achillini, one of the most violent impugners of his opinions, asserted that this nerve derived its origin from the fourth pair, the sixth or *abducentes* of later writers. About 1570, Eustachius in his plates exhibited this connection, but does not appear to have taught the doctrine publicly. The loss of these plates, and the hatred with which the schoolmen looked upon every dissenter from the orthodox creed of anatomy and physiology, were the causes of Galen's opinion maintaining its ground till Willis, by the assistance of Lower,[†] traced the communication of the sympathetic with the abducent and ophthalmic nerves.

The views of Willis were adopted by Raymond Vieussens [‡] and [§] Ridley, the high reputation of the former of whom tended to circulate and establish his opinion. But this view, though supported by the four greatest anatomists and physiologists of that day, was not long in being impugned by three celebrated men, the Dutch anatomist Raw, the German Professor Heister, and the Italian pathologist Morgagni. Raw denied its connection with the sixth pair, and maintained that it derived its origin from the second branch of the fifth; while Heister considered its roots to be furnished by the abducent, superior, and inferior maxillary nerves; and Morgagni professed himself unable, by the most minute dissection, to trace its connection with the fifth pair.

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[*] Galen. de usu part. Lib. xvi.

[†] Atque medici hic imprimis doctissimi et anatomices summe periti Domini Richardi Lower, ope et socia usus sum opera. Ad cereb. et Nerv. Anat. Præf.

[‡] Neurographia Universalis, fol. 1685.

[§] Anatomy of the Brain. Lond. 1695.

Lancisi, to whom we are indebted for the recovery of the long lost plates of Eustachius, asserts in his usual sweeping and reckless manner, that the sympathetic derives its origin from all the cerebral nerves,—an assertion of which he has given no proof, and met with no supporters.

According to Pourfour Dupetit its commencement is to be found in small filaments derived from the abducent, ophthalmic, and inferior maxillary nerves.

Francis Petit of Nemours, in a memoir published in 1727, differs from preceding anatomists, in supposing the sympathetic to be formed from the spinal nerves, and instead of receiving a filament from the sixth nerve to send one to it. The same view was taken by Winslow in his great work published in 1732.

From this time various writers devoted themselves to the examination of the distribution, structure, and functions of this portion of the nervous system, and the writings of Walther, Meckel, Haller, Girardi, Scarpa, Iwanoff, Ludwig, and Portal prepared the way for the more exact descriptions and more rational speculations of Soemmering, Bichat, Weber, and Lobstein.

As long as the anatomy of the sympathetic system of nerves was in its infancy, it was not to be expected that rational views of its functions could be propounded, and therefore we do not think it worth while to detail the absurdities of the early physiologists. Accordingly, we shall content ourselves with presenting our readers with a brief review of the doctrines of the more celebrated writers, from the seventeenth century to the present time, in order that they may more clearly comprehend the merits of M. Brachet's work, with an examination of which it is our intention to conclude this paper.

Our illustrious countryman Willis was the first who took an enlarged view of the functions of this portion of the nervous system. He conceived it to be placed between the conceptions of the brain and the affections of the *praecordia*, and between the actions and passions of almost all the parts of the body which have a reference to the involuntary functions. Hence a most rapid sympathy and connection were established between them. The *ganglia* were looked upon by him as simple knots, like those met with in the trunk of a tree, and as affording a sort of resting place to the animal spirits.* Considering the age in which Willis lived, and the imaginative nature of the physiology then prevalent, his views are entitled to our praise, and if we substitute the expression *nervous influence* for that of *animal spirits*, it will appear that he anticipated the views of later physiologists.

Vieussens, who in a great measure adopted the views of Willis, considers the sympathetic to be the medium of that remarkable sympathy which subsists between the brain and *viscera* of the abdomen, and that through this portion of the nervous system not only do the different states of the brain affect these *viscera*, but also in turn influence the brain and through it the mind. In the *ganglia*, which he generally denominates gangliform plexus, he conceived that a fermentatory principle resided, by which convulsive motions were induced in the muscular fibres.†

Lancisi compared the *ganglia* with the heart, and considered their use to be to draw the nervous fluid to so many centres, for the purpose of propelling it to various parts. He describes the motions of the *ganglia*, and gives an account of their structure suited to his hypothesis.‡

Winslow § considered the *ganglia* to be *nuclei* or separate origins of the great sympathetic, and thus to represent so many little brains; while by Meckel three functions were attributed to them, *1st*, to divide off branches into *ramuli*, and these into filaments; *2d*, to alter the course of the *ramuli*, and direct them to various destinations; *3d*, to unite several branches into one chord. The opinion of Meckel was embraced by Zinn, who, however, conceived that *ganglia* differed from plexus in this respect, that in the former the nerves were united by intimate admixture of substance, while in the latter they were merely placed in juxtaposition.

Johnston looked upon the *ganglia* as little brains composed of two substances, the cineritious and medullary, in which, besides the nutrient vessels, there were nervous fibres which lost their rectilinear direction and their former constitution. These *ganglia*, in his opinion, like the brain, evolved and communicated to the organs a nervous power, and were the origin of the nerves belonging to these organs which are not subject to the dominion of the will. By them also the power of the will is checked and limited, and all communication cut off between the *sensorium* and those parts which they supply with nerves.*

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* Thom. Willisii, Cereb. Anat. et Nerv. Descript. et usus cap. xxvi.

† Neurograph. Universal. Lib. iii. cap. v.

‡ Epist. ad Morgagni, de Gangliis Nervorum.

§ Expos. Anat. Traité des Nerfs.

Haase was of opinion that in the *ganglia* the nerves receded from each other, and, changing their direction, were distributed to the neighbouring parts; that in regard to their functions there was the greatest analogy between them and plexus; that nerves neither were intimately united in them, nor received any new cellular covering; and that the opinion of Johnston was erroneous, for two reasons, 1*st*, that muscles subject to the will received nerves from *ganglia*; and, 2*d*, that organs not influenced by volition received branches from the *par vagum*, on which there were no *ganglia*.†

Scarpa followed Meckel and Zinn in attributing to the *ganglia* the office of separating, mixing, and again uniting nerves, and, from experiments, endeavoured to show that all the *viscera* supplied by the sympathetic received nerves compounded of several distinct combinations, the filaments entering into which derived their origin partly from the brain and partly from the spinal chord.‡

Bichat was the first who erected a system upon the views of Meckel and Johnston. According to his theory, the whole sympathetic system, which he reckons the support of organic or nutritive life, is only a congeries of centres from which nervous energy is communicated to the organs. The distinguishing mark between the nerves of animal and those of organic life he states to be, that the former are connected with one centre, the latter with several. The *ganglia*, which he looks upon as nervous centres, are connected to each other by nervous filaments, and the chord which is commonly reckoned the trunk of the sympathetic is but an anastomosing branch extended between individual *ganglia*.§

On the notions of Bichat, Reil founded a theory which he supported with great industry and acuteness. The sympathetic he conceived to form a system distinct from the cerebral, to be met with only in some classes of animals, and to preside over nutrition, and that function by which the tear and wear of the organs are repaired. According to him it first appears in the *mollusca*, and in the more perfect animals is united with the cerebral or animal system, but nowhere does it emanate from it. Nerves do not arise from others like branches from arteries, but are formed each in its proper situation by the plastic power, and hence the expression *origin of a nerve* denotes only its mode of union with its proper system. There is this difference between the cerebral nerves and the ganglionic, that the former converge from the circumference to the body of the brain, and have only one nervous centre, while the latter have no central *focus*, are widely diffused, connect organs with each other, and assume three forms. 1*st*, They form a net-work around vessels, which is generally denominated a plexus; 2*d*, These plexus are connected with the brain and spinal chord, by branches termed by Reil *conductors*, as the renal, greater and lesser splanchnic nerves, &c; 3*d*, The two trunks of the sympathetic united below by the *ganglion impar*, and above by the brain through the medium of the fifth and sixth pairs of nerves, form an elliptic sphere, inclosing the whole system of *plexus* and *ganglia*, and with this sphere the fifth and sixth *glossopharyngeal*, *pneumogastric*, and *hypoglossal* nerves are connected. By the conductors of the plexus the animal and vegetative systems appear to be united and all the affections of the lower *viscera* are transmitted to the brain. The influence of the will would in like manner be communicated to the thoracic and abdominal organs, were it not interrupted by the *ganglia*.

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* Medical Essays and Observations, 8vo, Evesham, 1795.

† De Gangliis Nervor. Ludwig scriptores, &c. Tome i.

‡ De Nervis Comment. Cap. ii. 320.

§ Anatomie Generale, Tome i.

Farther, according to Reil, the uses of the *ganglia* are, 1*st*, to prevent the influence of the will from reaching the organs of vegetative life; 2*d*, to retain within their own sphere the impressions made on the organs of nutrition by the various vital processes, and prevent them from being communicated to the brain, whence the mind receives no information of the changes which take place in the interior of the *viscera*.

Into the pathological doctrines founded on the above theory, it is needless to enter here, as it is the physiology alone of the sympathetic system which it is our intention to discuss.[*]

Richerand considers the sympathetic system to contain the principle of vegetative life, and not merely to establish a closer connection and more intimate union between all the organs of the assimilating functions, but likewise to free those parts from the influence of the will. All those parts also which receive their nerves from *ganglia* are equally independent.[†]

Dr Wilson Philip is of opinion, that "the ganglions may be looked upon as a secondary centre of nervous influence, receiving supplies from all parts of the brain and spinal marrow, and conveying to certain organs the influence of all these parts.[‡]

Wutzer combined the theories of Bichat, Reil, and Wilson Philip, and endeavoured to support them by new arguments and experiments on living animals.[§]

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[*] Archiv. für die Physiologie.

[†] Elemens de Physiologie.

[‡] Experimental Inquiry, third edition, 1826.

[§] De Corporis Humani Gangliorum Fabrica atque usu, Berol. 1817.

In the same year as Wutser's work appeared, Weber gave to the world his comparative anatomy and physiology of the sympathetic. From his investigations it would appear, *1st*, that this nerve in Vertebrate animals is smaller the lower we descend in the scale; *2d*, that the less it is developed the larger do the branches of the pneumogastric become, which are sent to the intestines, and hence the latter descending to the intestines, so gradually increases in the lower vertebrate animals, and the former so gradually decreases, that in some of the higher invertebrate animals the sympathetic disappears, and its functions are performed by the pneumogastric alone; *3d*, that in various living creatures the size of the spinal chord corresponds to that of the sympathetic; *4th*, that the longer the intestinal canal is, the larger is the sympathetic; *5th*, that the vascular system is developed in proportion to the sympathetic; *6th*, that the spinal *ganglia* are to be reckoned the remains of the ganglious chord.

Weber, moreover, is of opinion that the sympathetic constitutes a separate nervous system, of which the *ganglia* are the centres, but not so separated from the cerebral system as to render all communication with the spinal chord unnecessary. The commingling and distributing of the nerves by the *ganglia*, he conceives to be a mere fortuitous function, and the power of the capillaries to be by no means owing to this system. In support of this last mentioned statement he brings forward the following arguments; *1st*, that the reproductive power in plants is very great, and yet these are destitute of nerves; *2d*, that the reproductive power is greatest in those animals in which the system of nerves is least developed; *3d*, that the minute termination of vessels upon which all reproduction depends cannot be furnished with nerves, for either the nerves on the most minute muscular fibres are without nutrient vessels, or the ultimate terminations of vessels must be without nerves, and as muscular fibres and nerves destitute of nutrient vessels are nowhere to be seen, and, on the contrary, the vessels of plants are never furnished with nerves, it is clear that the power of the capillaries cannot be owing to such influence; *4th*, that the heart and greater vessels, by which the nervous influence might be extended to the capillaries, are less developed the lower the animal is, and do not exist in zoophytes and plants, in which the reproductive power is greatest; *5th*, that the nerves themselves owe their origin to the productive power, and therefore could not be the cause of a process which was in action before they themselves existed. From these considerations he thinks it just to conclude, that, though they may be insufficient to demonstrate the proposition, that the reproductive power has nothing in common with the nervous, they at all events prove that the nervous matter is intimately mixed with the organized matter of the capillary vessels, so as to be reckoned part of their constitution. But the nervous filaments connected with the smaller vessels, and following their course, are to be reckoned as communicating the diffused sensibility to the nervous centres.

Weber farther hazards the conjecture, that the vessels of plants themselves may contain in their organic mixture some nervous matter, upon which their irritability and productive power may depend. Plants, however, as being destitute of a nervous centre and of nerves, do not possess either animal or organic sensibility.

From a review of what has now been stated, and from a consideration of several hints thrown out in the course of the work, we are induced to suspect that Weber attributed the greater power of reproduction in organized beings destitute of nerve to the nervous matter being diffused through their whole system, and, on the contrary, the diminished power of reproduction in the higher animals to this nervous matter being collected in central masses. We do not say positively that such was his opinion;—all that we intend to convey is, that what we have now stated may be fairly inferred from his treatise.*

The theory of Broussais is very ingenious. Like many of the physiologists who preceded him, he recognized the sympathetic as a separate system having a peculiar sensitive centre, which not only transmits to the common *sensorium* the impressions excited by the action of the *viscera*, but produces in it determinations, which, by the cerebral and spinal nerves, are communicated to the muscles subject to the will. In the fœtus the sympathetic nerve is alone vigorous and active, presiding over the secreting and nutrient organs, sustaining the energy of the heart, and not rarely invading the cerebral sphere, and producing in the infant automatic motions. Acephalous fœtuses destitute of a spinal chord, and hence without a nervous centre to produce muscular contractions, have performed motions which could be excited in no other way except by the vital power of the sympathetic nerve forming *anastomoses* with the spinal nerves. In the adult also that nerve, through the medium of some sense residing in the interior of the stomach, produces a wonderful sympathy between the brain and the thoracic and abdominal *viscera*, and in like manner, as in the embryo and fœtus, presides over the capillary system, and directs assimilation and nutrition by the aid of the plastic vital power named by Broussais vital chemistry.†

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* Anatomia Comparat. Nerv. Sympath. Lipsiæ, 1817.

† Journal des Sciences Medicales, 3 année.

In 1822, Dr Copland, in the London Medical Repository, commenced publishing a work on the anatomy, physiology, and pathology of the ganglionic class of nerves, which, however, was discontinued that it might appear in a separate and enlarged form. The work itself has not yet appeared, but its contents and an outline of the author's views are given in the appendix to his second edition of the translation of Richerand's Physiology. The ganglionic nerves, he asserts, are to be found in every class of animals, commencing with the lowest and ascending to the highest, and are the only portion of the nervous system with which the lower orders of animals seem to be provided. As we ascend the scale, another class of nerves is superadded, the encephalic, with which the ganglionic are connected, and in the higher classes of those animals which possess only the latter, the ganglion placed on or near the *œsophagus* assumes more and more the character of a brain, and becomes more and more connected with organs of sense. The nervous chords also, which are placed between the *ganglia*, arrange themselves in the form of a spinal chord, as the locomotive organs become distinct from the nutritive, and thus the gradation between the lowest class possessed of a voluntary system, and the highest destitute of it is scarcely perceptible. The difference between this class of nerves and the cerebro-spinal is farther shown in their respective appearances in the history of the embryo and fœtus, the phenomena exhibited by monsters, and last of all in the different effects of excitants and reagents.

Moreover, as the ganglionic system of nerves differs from the cerebro-spinal in appearance, structure, properties, and distribution, it is natural to infer that its functions are also different. Accordingly, he attributes to this class of nerves all the phenomena of organic life, besides certain obscure sensations or instinctive impulses, which are communicated by the cerebro-spinal system of nerves to the *sensorium* and spinal chord, and through their agency produce various phenomena.

Lobstein, whose work on the sympathetic may be looked upon as by far the most complete on the subject, states its functions and uses to be three. 1*st*, To preside over nutrition, secretion, the action of the heart, and the circulation of the blood; 2*d*, to maintain a communication between various organs of the body; 3*d*, to be the connecting medium between the brain and the abdominal *viscera*. Thus the ganglionic system of nerves controls all the actions of the abdominal *viscera*, imparts power, tone, strength, and energy to them, excites, sustains, and directs these functions; and, on the contrary, when diseased, disturbs them.

We shall cite only two other opinions, those of Dr Alison and M. Ollivier.

Dr Alison maintains, that "the ganglionic nerves are sent to moving and secreting parts to enable them to contract and secrete;" that "they are sent thither to subject these contractions and secretions to occasional change from certain involuntary mental acts, of which all animals are susceptible, and which are notoriously and for useful purposes endowed with the power of affecting the organic functions of the body, which the will cannot affect."

The opinion of M. Ollivier, as stated in his article in the 20th volume of the *Dictionnaire de Medecine*, appears to be a compound of those of previous writers on the subject. According to him the *ganglia* seem to arrest or diminish the influence of the nervous centre over the ganglionic nerves, and thus to isolate the organic from the animal system. He also agrees with Dr Wilson Philip, in supposing them to concentrate the nervous influence which they derive from the spinal chord, and distribute it to the organs with which they are connected. The filaments with Reil he considers to be a species of imperfect conductors, which transmit neither chemical nor mechanical irritation but galvanic only, which traverses them with great rapidity, and produces either contractions or sensations, which the individual may feel as in morbid intestinal irritations, *nephritis*, &c. In fine, the great sympathetic presides over nutrition, secretion, the distribution of that nervous influence which animates the heart, alimentary canal, and genito-urinary apparatus, and the numerous sympathies which connect the organs of vegetative life. The numerous anastomoses of the cephalic portion of this system show distinctly direct communication between it and the organs of sense.

In this brief, and to a certain extent incomplete, view of the various doctrines regarding the sympathetic nerve, we have omitted many with which those familiar with the subject must be acquainted; and this we have done because they were either deductions from those which we have given, or of too little consequence to occupy the time of our readers. It will be observed also that we have made no mention of the immediate cause of the influence of the nerves, or of the various doctrines connected with it, the subject being, in our opinion, a very unprofitable one, and no doctrine having any firmer foundation to stand upon than its plausibility.

We now proceed to give some account of M. Brachet's work, which professes by experiment to throw new light on the subject.

The volume contains a preface, some introductory remarks, and two sections, the first comprehending the general, the second the particular or special, functions of the ganglionic system of nerves.

In the first section, after pointing out the difference between organic and inorganic matter, and asserting that in animals the nerves are the instruments by which the vital influence is communicated to the various organs in the shape of sensibility, and that each organ possesses that degree of sensibility which is necessary to enable it to exercise its functions,—that there can be no sensibility without nerves, and that without sensibility there can be no life,—M. Brachet proceeds to show that sensibility is a property of vegetables as well as of animals, and that in them it operates in the same manner through the medium of the nerves. In proof of this he mentions various phenomena of plants, such as the contraction of the sensitive plant, the *Dionæa muscipula* closing on insects its prickly leaves, the *Hedysarum gyrans* constantly agitating its leaves in hot weather, the barberry and common *Helianthemum* exhibiting every spring the well known motion of their stamens at the moment of fecundation, plants directing their roots to where the soil is good, seeking for the light, and each in its own way manifesting its sense of the presence of the sun, some by opening at its approach, others by closing and avoiding its rays. Passing from these acts of sensibility to more hidden phenomena, he details his views at greater length, of which we shall lay an abstract before our readers.

As we descend in the scale of animated beings we see certain organs and functions disappear, till in the lowest classes no organ of sense or intelligence remains. The complicated apparatus of respiration and voice is no longer met with, the circulation is altogether capillary, reproduction takes place by offshoots, the apparatus of locomotion is scarcely rudimentary, and the animal is reduced to digestion, absorption, nutrition, increase, exhalation, capillary circulation, generation, and death. These animals, however, closely allied as they are to the vegetable kingdom, and ranked by some naturalists as plants, perform all these functions under the influence of the nervous system. From want of attention their nervous system was for a long time overlooked, but it has been proved that the tubercular swellings and whitish filaments which they exhibit are true nerves. All the functions which remain in the most imperfect animals, with the exception of digestion, are to be found in plants. After illustrating this by an appeal to vegetable physiology, M. Brachet concludes that since plants give numerous proofs of sensibility, and perform the same functions as animals, they cannot differ so much from each other as has been supposed, and that he who compared a plant to an animal deprived of motion, and an animal to a plant endued with mobility, was not far from truth. But this analogy between the functions of animals and those of vegetables gives us reason to infer, that there is also an analogy between them in the manner in which each function is executed and life developed, maintained, and terminated. Almost all modern physiologists regard the ganglionic system of nerves as the agent of organic functions. Nerves are the agents of sensibility, and in some measure the organ of all the functions. Now, as vegetables are endowed with sensibility, and perform functions, it behoves them to be possessed of the agent of that sensibility.

The vital properties of plants have long been recognized by naturalists. De Gorter, in 1737, first distinguished the vital irritability of plants from mechanical elasticity. Darwin attributed to them sensations, some sentiments, and even a certain degree of voluntary power, a common *sensòrium*, whence, as in animals, was derived a certain number of catenations or movements. Lippi and other physiologists admitted this irritability in different plants; and Vicq-d'Azyr allows them sensibility, and places them along side of zoophytes. Lametherie, in a very extensive work on the physiology of plants, asserts that they are possessed of all the functions of animals. The interpretations which he gave of phenomena may no doubt be looked upon as somewhat forced, but they prove at least the susceptibility of vegetables, and the influence of different modifying agents. These phenomena are to be referred to a nervous apparatus, which, though scarcely suspected hitherto, is well developed like that in animals, and is placed on account of its importance, at a distance from all destructive agency, in the centre of the plant, constituting the pith.

This position M. Brachet supports as follows. On opening a vegetable from the most slender radicle to the last ramuscle, it will be found to be composed of different tissues, as far as the centre, which is occupied by a spongy substance, without consistence. This substance furnishes laterally medullary productions, which sprout on the surface of the bark, or spread themselves over all the parts of the vegetable and medullary appendices, which do not extend beyond the ligneous tissue, and the pith of which is always colourless, like that in the medullary canal. Looking at a plant in the first stage of its existence, we find the germ swelling with moisture, and sending off in their respective directions the plumule and the radicle. The germ and its first rudiments are almost altogether medullary substance, the plumule and radicle enlarge and separate from the cotyledons, a pellicle envelopes them, and assumes by degrees the character of bark. The succeeding developements are not in the same proportion as the preceding, the pith remains as it were stationary, while the other parts increase considerably, and hence the medullary substance is more abundant the younger the plant is; a circumstance which is also remarked in animals. At the period of inflorescence and fructification, the stalk of the flower, the generating organ endowed with the greatest vitality, contains in its interior a considerable portion of pith.

The species of intersections or rather swellings of the *medulla*, which are more or less near to each other according to the plant examined, deserve attention. These knots are not equally developed or visible in all vegetables, and hence, for the purpose of study, certain plants are to be preferred, such as the vine, elder, *persicaria*, the *Caryophylleæ*, the *Gramineæ*, several rushes, &c. On dissecting, for instance, a young elder tree, a large medullary canal will be observed, uninterrupted between each knot, where, however, the pith, combined with a new substance, changes its character a little, and sends here and there filaments proceeding to the ligneous substance where, from their tenuity, they are soon lost. In these swellings or *ganglia* the medullary filament of the leaf and those of the flower and leaf-bud, which is one day to form a branch, are seen to terminate. At this point the plant is more feeble, and is easily broken, because the ligneous substance is there thinner and traversed by filaments. When the plant is older the ganglion does not preserve the same consistence; it is more concentrated, becomes firmer, more resisting, less thick, and forms a true diaphragm. At whatever age the plant is examined, it always presents this nodosity when a branch projects from it; but when this does not take place, the ligneous portion projects internally, diminishes the medullary canal, and renders the medullary matter almost uniform throughout its whole extent, as is observed in the trunk and larger branches. Such medullary *ganglia* are very apparent in plants with opposite leaves, but much less so in plants with alternate leaves, except at the point at which a branch projects where a ganglion is always found.

The anatomical disposition of the pith indicates its importance, which is further demonstrated by the following experiments instituted by M. Brachet.

On several branches of an elder tree he made a sufficiently large opening at the middle of the cylinder placed between two knots, and by means of a stylet destroyed the pith; no sensible effect resulted, the cavity either remained or closed, but the branch did not perish. In two branches which he examined, the cylinder was irregular, more slender and depressed where the openings had been made. The ligneous substance was thickened, and the medullary cavity had disappeared. In one of the branches he could trace across the ligneous substance two small medullary chords, which extended from one ganglion to another. The same experiments were repeated on several other plants with the same negative results. From the difficulty of operating, the trunk often perished, which, however, is to be attributed rather to the mangling of the portion subjected to experiment than to the destruction of the pith.

It is well known that, on introducing mercury by a small opening into the trunk of a tree, it will perish if the metal reaches the pith, but will live if it does not. Of the action of mercury on the pith M. Brachet convinced himself by several experiments.

On making an opening near the knot, sometimes above and sometimes below, and destroying with a stylet the intersection or medullary ganglion, he found that the result varied according to circumstances. When the trunk was young death followed soon after the operation, when it was older, and a branch proceeded from it laterally, the trunk did not always perish, but the branch rapidly decayed: in fine, when the branch had existed for several years, death did not always follow the experiment and the opening cicatrized. In those branches which perished soon after the experiment, the *ganglia* had been destroyed, but in such as survived some portions of the *ganglia* and some medullary prolongations remained. In order to ascertain whether the ganglion was regenerated, or if the small portion which had escaped the instrument was sufficient to support life, M. Brachet performed several experiments. Having remarked with what facility portions of willow, *acacia*, and elder produced a plant, he endeavoured in various ways to produce this effect. Branches somewhat long placed in the earth always sprouted, and branches rather shorter did the same, provided several knots or intersections remained on the elder, or several of those eyes announcing a disposition to form a branch, when the plant operated or happened to be willow or *acacia*.

When only one knot remained on a small portion of elder, whatever portion was placed in the earth, vegetation did not take place. In one instance, however, when the branch was almost covered with earth, the knot furnished on one side a stem, and on the other a root.

Whatever length the stem was placed in the earth, it did not sprout when the pith was destroyed.

The elder did not shoot, when, instead of destroying the whole pith, the medullary *ganglia* corresponding to the ligneous knots were disorganized.

On cutting a potato into several fragments, and placing them in the earth, those alone will be found to shoot which have several eyes entire, and if these eyes be traced they will be found to be possessed of all the characters of a small medullary apparatus.

To insure success in most of these experiments, it is not sufficient to pass the stylet into the ganglion ; it must be totally destroyed, as without this precaution the stem will continue to shoot as before. To cause the branch to perish, the pith must be destroyed with a crooked stylet as far as the origin of the branch itself.

The following experiments on the bark are worthy of attention. When in destroying the pith, M. Brachet at the same time made a semicircular incision with loss of substance immediately below the leaf-bud, it never increased in size, but always died away. The experiment never failed when there was loss of substance, but when there was merely a simple incision, the bark came together, frequently united and continued its functions as before. When a semicircular incision was made below a young branch, without destroying the pith, the branch did not wither, but grew with less vivacity ; its vegetation was less active, it merely languished.

On making a circular incision around and very near a leaf-bud, removing a portion of substance, but without involving the piths, death of the leaf-bud or of the young shoot most frequently followed. Vegetation, however, sometimes continued in young vegetables or young plants, especially when the ligneous portion was less compact. The branch too was developed, but less rapidly than the neighbouring ones. When, however, he destroyed at the same time the pith with suitable precautions, the vegetable was constantly annihilated in the branch. The same results followed the same experiments on stems placed in the earth.

These experiments, though apparently contradictory, are not so in reality. The bark may be looked upon as the circulating system of the tree. If the whole circumference be divided, the circulation will be completely interrupted and death will ensue. If it be only partially divided, it will be carried on to a certain extent, but not sufficient to convey the proper quantity of nourishment, vegetation languishes, and the tree will perish if cicatrization do not take place. The same takes place in ligaturing a large artery in an animal. Sensation and motion are lost in the part deprived of the nutrient fluid, and death takes place, unless the circulation be restored or continued through anastomosing branches. The bark then is the principal circulating system in vegetables. Supposing, however, that it is more particularly devoted to the return of the lymph, as MM. De Candolle, Dutrochet, &c. believe, it would still be a very essential part. It would, indeed, be their venous system, and present a sort of resemblance to those animals whose veins ramify chiefly on the surface under the integuments. Even according to the experiments of Dutrochet, however, it would serve also for the ascent of the sap. The circulating system of vegetables like that of animals receives a great number of filaments from the ganglionic system of nerves, which Prochaska regarded as the nervous system of circulation. These filaments accompany the capillaries throughout, are identified and distributed with them, and, as in animals, form round them an uninterrupted plexus, which renews and supports them indefinitely, so that this plexus in some sort isolates each part of the plant from the whole plant, and often gives it an independent existence, provided the separated portion preserves some *ganglia*, and nutritive matter be presented for absorption. Thus small slips of trees, plants, or flowers, detached and placed in water vegetate for a long time before perishing.

To the above M. Brachet adds, that he has several times placed ligatures strongly tightened round young slips of elders and willows, when the circulation being intercepted, the slip withered, but regained its activity when the ligature was removed and the circulation renewed. In fine, to remove all doubts regarding the true functions of the bark, he dissected that part of this organ which constitutes the leaf-bud, and found all the rudiments of a medullary ganglion, which communicated with the central ganglion of the pith, and at which several medullary prolongations terminated. To convince himself that this was really the nervous germ of the slip, he several times destroyed it, and the branch, which would have been developed at this point, never appeared. He engrafted several young trees in various ways. When he engrafted an eye, that is a portion of bark with a leaf-bud, the leaf-bud almost always furnished a stem. Observing that the portion of bark which is raised to cover the scion died and fell off, and that the borders of the graft united afterwards with the portion of the bark which remained healthy and attached to the tree, he conceived that it would facilitate adhesion if the superabundant portion of the bark were cut off, so as to deprive the stock of a portion of bark exactly of the same dimensions as the graft itself. Experiment proved the correctness of his views. Wherever he adopted this method of engrafting, provided he covered the graft with gummed paper and some turns of thread, so as to leave merely the leaf-bud free, the union was always more rapid, that is in the inferior part; and the scion was always rather confounded with the bark of the stock in which it had been implanted. He also destroyed the eyes of several grafts before applying them to the new tree; they adhered, but never gave origin to any branch. From these experiments he conceives the true functions of the bark to be ascertained. They confirm his observations regarding the destruction of the pith; for vegetation was more or less diminished or abolished in the twig, according as the pith was more or less destroyed. The graft never sprouted when the bark was destroyed at the same time as the pith, above where it was implanted in the stock. He often saw the scion vegetate feebly, and afterwards perish when its bark was not in connection with the bark of the tree, whether it was too large or too small, and thus in this operation the greatest care should be taken to establish the most exact relation between the two barks.

Thus the action of the bark on the life of vegetables, instead of contradicting, confirms what has been said concerning the pith. The same takes place in animals. Sensation alone cannot maintain life. The living being requires new matter to be incessantly presented to all the organs, and in both the nutrient matter is applied by means of a vascular system, the function of which constitutes the circulation. If the life of an animal cannot be preserved without the circulation, how should it be different in the vegetable? The same effects follow from the same causes, and nature never unnecessarily multiplies her means.

From the experiments detailed above, but especially those relating to reproduction, M. Brachet conceives that he has proved that the medullary apparatus of vegetables is a true nervous system. If, in fact, the pith were without action and without influence, how could the destruction of the *ganglia* annihilate the vivifying principle and oppose reproduction, while a much more extensive laceration of the medullary chord does not prevent the new tree from being reproduced, provided the *ganglia* are uninjured? He was tempted to have extended his inquiries, and to have inquired how far the ancients spoke the truth, when they mentioned an experiment by which they attempted to destroy the whole pith of a tree, for the purpose of rendering the fruit more savoury and devoid of kernels. The operation he is inclined to think impracticable, especially in trees with knots, and even if it were, it would prove nothing, because it could not destroy the nervous filaments, or medullary prolongations which traverse the ligneous tissue, the sap, and the bark. The pith, then, is the nervous system of the vegetable, but it has no one centre of action, or rather each point may become an independent centre. It presents, however, three distinct parts. *1st*, The *ganglia*, which are the principal seat of life; *2d*, The medullary chord, which establishes a continuity between the different parts, has no action by itself, and owes all to the *ganglia* from which it emanates; *3d*, The medullary prolongations or filaments which are found throughout the vegetable, and principally in the bark, where they form immovable ramifications with the vessels, which they accompany everywhere. Thus the nerves of vegetables belong to the ganglionic system.

The more we advance, the more striking, according to M. Brachet, is the connection between the nerves of plants and the ganglionic system in animals. The two laws of *endosmosis* and *exosmosis*, established by Dutrochet, he maintains, will not account for the phenomena referred to them, unless we suppose them to be influenced by the organ of life, viz. the nervous system. Without this, *endosmosis* will produce neither secretions nor the phenomena of increase, efflorescence, and fructification; liquids will rise and traverse the vessels, but will never be transformed. Place a dead tree in the condition most favourable for *endosmosis*, it will still remain dead. Place in the same conditions a branch of a living, and one of a dead willow; dispose the latter in the manner most favourable for *endosmosis*; it will not vegetate, while the former will shoot out roots and grow. Considering the existence of a nervous system in vegetables as proved, he is at no loss to explain clearly all these functions.

All the living tissues are traversed by innumerable capillary vessels, which receive from their nervous filaments sensibility and contractility, to which all the functions of vegetables may be referred. The absorbents, which have their mouths opening on the surface of the whole plant, are informed by the nerves, by their sensibility, of the presence of surrounding bodies, open to those which are suitable to them, and reject those which are useless or injurious. Whether the substance be solid or liquid, it must circulate in the latter form. As it advances in the capillaries, its presence is announced through the medium of the nerves, and by the contraction of the vessel, it advances to supply each organ with the materials requisite for its nutrition, secretions and exhalations, and the choice of which is regulated by the impression which they make on the nerves of each; the sensibility of which is modified according to its organization.

Though generation be performed by a very complicated apparatus, which exhibits the highest degree of vegetable organization, it owes to sensibility all its means of action. By it the matter is chosen for the developement of the generative organs, by it the stamens incline to the pistil, and dart the pollen at the moment when the fecundating power is acquired, the stigmata of the pistil recognize the fructifying powder and absorb it, and the pistil transports it to animate a germ which without it would have been incapable of reproducing a vegetable. If it be recollected that much of the pith is distributed to the flower, and that those plants which contain most of it, yield most flowers and fruits, it will not appear astonishing that generation presents so great a number of vital phenomena.

M. Brachet next proceeds to defend the aphorism of Cabanis, that life is sensibility. Suppress sensibility, he observes, and all the functions of life cease. The aphorism will appear false only to those who, limiting the phenomena of life, recognise only that sensibility which perceives, without considering that this mode of sensation belongs to a system of nerves peculiar to the animal, and to an apparatus of functions which is not indispensable to life, because an immense number of living beings exist without possessing them. The mystery of life is still veiled from our eyes. We see the organs by which it is manifested, and can appreciate their action, but no investigation of ours leads us to its principle or essence; our feeble senses and limited intelligence prevent us from seeing it. In this state of ignorance, however, we have no right to conclude, as some modern physiologists have done, that *life* is a word devoid of meaning, or to reduce man to a statico-hydraulic-hydrostatic machine, to a chemical laboratory, to a mechanical automaton, and to see in the process of digestion merely maceration—in nutrition and the secretions only some new chemical operations.

After exposing the absurdity of seeking for one only centre of life, he proceeds to show that though vegetables, from being deprived of the organs of sight, touch, hearing, and of a cerebro-spinal nervous centre, can neither see, touch, hear, nor understand, they may yet execute those functions for which they possess organs; and that it is just as absurd, because we happen to have functions of a higher order, to deny them those which they possess, as it is from some marks of sensibility, which they possess, to conclude that they are endowed with intelligence. For the exercise of any function two things are required, an organ vivified by a nervous system, and the action of stimulants, or functional excitants, and every function when analyzed will be found referable, as Bichat has declared, to sensibility and contractility. In examining the meaning of these two words, M. Brachet takes a rapid view of the opinions of the school of Bichat, whom he accuses of having transformed functions into properties. The absurdities and contradictions of the ontological system of physiology, he exposes at considerable length, and declares that there are no vital properties. What has been called a vital property is but the constant result of the action of an organ,—in a word, a function. Physiology ought only to admit, 1*st*, perceptible sensation, or that of the cerebral nerves; 2*d*, imperceptible sensation, or that of the ganglionic nerves; 3*d*, muscular contraction, *voluntary* or that of the locomotive muscles, *involuntary* or that of the muscles of the *viscera;* and 4*th*, capillary contraction. Beclard, in his Elements of General Anatomy, never speaks of vital properties.

M. Brachet thus sums up his views of the general functions of the ganglionic system of nerves. Organized beings are vegetables or animals. The first perform their vital or organic functions under the influence of the ganglionic nerves. From analogy it may be inferred that nature, always uniform in her proceedings, has not created different organs for the same functions, and consequently, absorption, capillary circulation, nutrition, secretion, exhalation take place in animals in the same manner as in vegetables, under the influence of the ganglionic nerves. This was the opinion of Bichat and of most modern physiologists. But Bichat, not wishing to extend the action of organs further than he could trace their anatomical existence with his scalpel, and not being able to follow far enough the branches of the great sympathetic, supplied the place of the nerve with organic vital properties, wherever he could not detect it. The patience and perseverance of anatomists have overcome this difficulty; and the trisplanchnic nerve has been traced to the most distant points, accompanying arteries and forming a plexiform net-work around them. Many of the branches assume the appearance of a ganglion, regenerate and continue the nerve; for without successive renewals it would have been impossible for a slender filament to furnish nervous influence to a whole member.

Thus in vegetables the ganglionic system of nerves resembles that of animals both in anatomical disposition and functions. Everywhere a nervous chord is found often interrupted by swellings or *ganglia*, which are the centres, the terminations, the origins of each nerve. These *ganglia* preserve and regenerate the vital action, because in destroying them, life is destroyed in those parts to which the nerves furnished by them are distributed, because the vegetable deprived of them is not reproduced, and because the smallest portion of a plant may become an entire plant if it possess one nervous centre. Everywhere filaments are found distributed which are not diminished by supplying the organs, but which are multiplied and reproduced as it were in the middle of a small body, or ganglion placed across the filaments or in the centre of the organs. These everywhere communicate to the organs to which they are distributed, organic sensibility, which receives molecular impressions from the materials of nutrition, makes choice of them, and produces the capillary reaction on those materials to change or circulate them.

In the concluding portion of this section M. Brachet endeavours to show that there is a gradation of innervation from vegetables up to man, in whom and in the higher classes of animals there is found a nervous system, with which the ganglionic is closely connected, and which is so much the larger in proportion to the extent of the sympathetic system the higher the animal is in the scale of existence.

We have given this detailed exposition of the general views of M. Brachet, that the reader might be the better prepared to follow him through the various experiments instituted to discover the special functions of the ganglionic system of nerves, which form the subject of the second section, and of which it is our intention to give an account in the next Number.

ART. II.—*Report from the Select Committee of the House of Commons on Medical Education, with the Minutes of Evidence, and Appendix.*—Part I. *Royal College of Physicians, London.*

IN the forty-fourth volume of this Journal, we commenced an analysis and examination of the First Report of the Select Committee of the House of Commons on Medical Education, and concluded the article with the evidence of Sir Henry Halford. The next gentleman who appeared before the Committee was Dr M'Michael, who has occupied the offices of Censor and Registrar of the College.

He adopts the same tone as Sir Henry Halford does with regard to Dr Wells, whom he represents as a "disappointed individual," and therefore as likely to give a certain colouring to his transactions with the college; as a "clever scientific man;" as an "extremely irritable person;" as not having been an "eminent physician," nor the author of any "great work" in medicine; and as not having succeeded in the profession, though this is the case with many highly deserving men. Dr M'Michael states his being but little acquainted with Dr Wells's writings; and though he admits that he is the author of a very important paper on rheumatism of the heart, he nevertheless feels himself justified in classing all his other productions with those which abound in the magazines and publications of the present day. He was a little pressed on this and some other parts of his examination, and was obliged to allow that, as far at least as Fellows of the College are concerned, it is not necessary to write great works in the present advanced state of medical science. Dr M'Michael seems to evince a good deal of gratuitous want of candour on the subject of Dr Wells, concerning whom he at length states that his bad temper, though he did not know him, may have made him many enemies, and might be considered as rendering him unfit for admission into the College of Physicians, though he was the most intimate friend of Drs Pitcairn and Baillie.

Dr M'Michael considers it as essential to the character of an accomplished physician, that he should have, in addition to his medical attainments, the best and highest education within the reach of an English gentleman. The most distinguished fellows he represents to have always been closely connected with the English universities; and ascribes the circumstance of many of them, at an early period, going abroad for their medical education, to the state of medical science being much more advanced there than in England; but admits that though the foreign were much before the English universities, they were not so distinguished as the Scottish universities are now, which must be regarded as in advance of Oxford and Cambridge, though he considers the metropolis to be, at present, the best school of medicine in the kingdom. He considers it as of no consequence where the Latin and Greek are obtained, which are requisite for an accomplished physician, but views the residence which is required in an English university as the best test for moral character. He represents it as scarcely possible to do in three or four years what is effected in eleven; but overlooks the important circumstance which we had occasion to notice in Sir Henry Halford's evidence, namely, that the period of residence, and therefore of education, at an English university, extends only to the first three years, and even as to this period, *term-trotting*, or a residence confined to half the term, though not often practised, will suffice at Cambridge. If the degree is obtained, the residence, and therefore the good conduct and qualifications dependent on it are inferred; nor is *term-trotting* ever inquired about, or the *term-trotter*, if known, subjected to a greater examination than a regular resident.

Dr M'Michael states that all physicians are alike in rank, which is greater than that possessed abroad; that there is a very mistaken notion of the value of the fellowship; that there is only more "facility perhaps" for the English graduate's obtaining admission into the college, than for those who obtain their degree elsewhere; that no one has a right to claim admission into the fellowship of the college; and that such admission should be entirely in the breasts of the fellows, without reference to the place of education.

In many parts of Dr M'Michael's evidence, he seems to have much difficulty in reconciling the liberality of feeling with which he appears to be actuated on the one hand, with attachment to exclusive privileges on the other. He admits that, at a certain period of life, a considerable portion of the "scaffolding of learning" is cast down, which is necessary to enable a man to pass a creditable examination, and that the bye-law which is to admit a licentiate to examination as a fellow is therefore in a great measure inoperative, because few will venture to pass through a second ordeal; and yet he contends for the propriety of the concealment of the bye-law, by which such examination was to be permitted, on the ground that it only concerned the fellow who was to propose the licentiate for examination. Only concerned the fellow, when the assent of the licentiate was required, and his most vital interests were involved in the business! Well, indeed, was it said by Dr Stanger, that the college, like Caligula, wrote their own laws in so small a character, and placed them so high as not to be read; and to such sort of miserable sophistry do sensible men condescend to resort when once they get fairly imbued with corporation feeling. Dr M'Michael is desirous that medical education should be principally conducted in London, and that the power of conferring degrees in physic should be entrusted to the College of Physicians. For this purpose a petition has, he tells us, been presented to the King in Council, to which no reply has yet been given. He states that examinations before the college last about half an hour, and are conducted by the President and Censors; that this body has the power of examining medicines, and of destroying such as are found defective; that there is only one examination of extra-licentiates; and that, though there is not the power of fining such physicians as practise in the country without a license, they are liable to a prosecution for misdemeanour at common law. Such an action was, however, never brought; and it clearly appears that a very large proportion practise on the strength of degrees obtained in Edinburgh or elsewhere, without thinking it worth while to belong to the College; for though many who are resident in the country are on the College list; yet these are principally such as have once lived in London, or whose views have at one time or other been directed thither.

In a short subsequent examination, Dr M'Michael states that the practice of midwifery does not now exclude from the fellowship, if there is a *gravis aliqua causa* for permitting this branch of practice; that evening meetings for reading papers are held at the College, and that the College seriously intended publishing another volume of Transactions three years ago, the preface to which was prepared, and is given in his evidence. (p. 319.)

When he was asked whether Dr Wells was the original discoverer of rheumatism of the heart, the paper on which was mentioned with great approbation in his former evidence, he replied, "He was not. Dr Baillie distinctly states in both his works, that on Morbid Anatomy and in another work, that Dr David Pitcairn, who was a fellow, was the person who originally pointed it out to the profession. I have brought with me Dr Baillie's work." Now this statement of Dr M'Michael obviously leaves it to be inferred, that Dr Wells had assumed, relative to the disease in question, a credit for originality of observation to which he was not entitled; and yet with singular and reprehensible want of information, if not want of candour, Dr M'Michael, who appears so studiously anxious to disprove Dr Wells's claim to originality in this matter, and is even at the trouble to take a book in his pocket, in order to corroborate his statement, omits the important fact, that in the first page of his paper (Transactions, Medical and Chirurgical, Vol. iii. p. 373,) Dr Wells mentions Dr Pitcairn's claims in the fullest and most unequivocal manner, and states likewise the part which Dr Baillie had in making them known to the public.

Dr Seymour, Physician to St George's Hospital, was next examined, by the Committee. He states that, at Cambridge, nine years are required for persons who go out in arts, to be enabled to practise Physic, namely, three years for the degree of Bachelor of Arts; four more for that of Master of Arts; and two more for a license to practise, which is given under the Common Seal of the university, after one examination of considerable length, by the Regius Professor of Physic. The intermediate education is voluntary; but in Dr Seymour's case it appears to have been liberal and efficient. He by no means, however, does our great northern school justice, when he says that "no anatomy is to be learned at Edinburgh;" and we are surprised at the ignorance which he thus exhibits of the facilities which have been afforded, for a long series of years, in the schools of Edinburgh, for the cultivation of practical anatomy.

With regard to the restrictive laws of the College, Dr Seymour thinks, that though "the regular road should be still kept through the English universities," for the admission of fellows, "the gates should be set open wide for the admission of licentiates," and that the justice of the case would be answered by allowing the licentiates to nominate a certain number annually, or biennially, for election as fellows, as half a dozen, of whom three should be chosen.

He is aware that, by a clause in the 32d of Henry VIII, "Surgery forms a part and parcel of medicine;" but he thinks it advantageous to the interests of physic and surgery, that the practice should be kept separate. Midwifery, however, he thinks, may very properly be admitted to be practised by fellows of the College, though they are prohibited from doing so at present.

Dr Seymour is at much pains to show that the ballots for a licentiate physician, who is to be examined for admission as a fellow, are, as much as possible, the same as those to which an Oxford or Cambridge man are subject; but he singularly overlooks the difference of the parties by whom, principally, the ballot is exercised;—namely, that in the latter case the judges are a sworn and select body, while in the former they are the body at large, who have no responsibility, and in whom the operation of personal feelings might, according to Dr Seymour's candid admission, in the case of Dr Wells, be by no means improbable. With regard to the general education of physicians, his views seem to be judicious; and while he objects to the London University being entrusted with the power of conferring degrees, on the ground that such power would be injurious to the other great medical schools of the metropolis, he thinks it might be safely intrusted to the College of Physicians, who have it in their power at present to admit a person to practise physic, whether he have a degree or not.

He thinks the present division of the medical profession to be useful; and is not of opinion that it would tend to the respectability of the profession, or the good of the public, that there should be only one standard of qualification. He believes that much difference of opinion exists as to the powers of the College, and the proper mode in which they should be exercised; but thinks that though the College has the law in its own hand, and nothing but an Act of Parliament can take it away, yet that there are no defects in the system of the College, which cannot well be changed by the College itself, and nothing so bad as to require the interference of Parliament.

Dr Seymour is of opinion that the College should have reserved to themselves the power of examining the general practitioner. He feels it difficult to determine the best mode of remunerating this class of the profession; and thinks the apprenticeship (which is erroneously stated at seven years instead of five) should be waived in the case of graduates who choose to act as apothecaries.

Dr Waterfield, Fellow and Censor of the College of Physicians, next came before the Committee. He went late to Cambridge; and being a fellow commoner (into which rank as living with the fellows, men of fortune, and more advanced students generally enter,) he was excused attending various lectures. In his time, likewise, students in physic were not required to attend the classical and mathematical lectures, though they must do so at present. The knowledge of Greek required of those who are examined as fellows of the College, or rather as candidates, previous to their election as fellows, he does not consider as greater than is possessed by most diligent young men when they leave school.

Dr Warren, one of the Elects of the College, considers the rank which physicians hold in this country, in a considerable degree owing to the connection which the College of Physicians has always held with the universities; and is of opinion that the prospect of being admitted a fellow of the College operates as an inducement to persons intended for physic to go through the English universities. He represents the character of physicians (though it is from report only) as being higher in this than other countries; says they are better received in society; are more learned and better informed men; and in consequence of these qualifications fill a rank in society which practitioners abroad do not usually attain. He admits, though with some difficulty, that this higher state of morals and manners, is attributable, in some degree, to the manners and morals of the society in which they are called upon to exercise their practice. He thinks that there should be some abatement of the privileges now exercised by the College; namely, that the order of candidates should be done away, and that the graduates of Oxford and Cambridge should only have an earlier eligibility to the fellowship of the College, than those of other universities, but that this change may be effected by means of the College itself without legislative enactment.

Morals, manners, and general qualifications are what are looked to in a high degree from the English universities. Individuals are received from those establishments on the faith of the professors who examine them; and yet Dr Warren is compelled to admit, that but a low standard of classical and mathematical attainment is necessary to obtain a degree in Arts at an English university, on which the whole superstructure of his reasoning on the subject of education depends. He is much pressed as to whether it would not be proper to endeavour to ascertain, by examination, the requisite fitness of candidates wherever they may have been educated; and though he doubts the plan answering, he cannot deny the *justice* of the thing as an abstract proposition.

The necessity of an *ad eundem* degree for a Dublin graduate is insisted upon as a guarantee for character and education: but Dr Warren admits, that it is a very imperfect one, in as much as it affords no security for residence having taken place. A Roman Catholic may be a Doctor of Physic of Dublin, but he cannot be incorporated into an English university, so as to be admitted into the class of candidates in the usual way. He may, however, become a licentiate, and then acquire an equal eligibility with other licentiates to election as a fellow.

With an appearance of marvellous simplicity of mind, not quite compatible with the well known shrewdness of his character, Dr Warren cannot conceive why a licentiate, whom he offered to propose to the *comitia majora* for examination as a fellow, should have declined his proposition, and preferred being introduced into the College by the President, without examination, as if licentiates were as much enamoured of Greek, ballots, examinations, and *comitia majora*, as was Dr Pearson himself, to whom we have more than once had occasion to allude.

Dr Wilson is an Oxford graduate, and teacher of Anatomy in London. He obtained the first class, both in classics and mathematics, and was one of Dr Ratcliffe's travelling fellows, to whom an income of rather more than L. 300 is attached, for ten years, on condition that one-half of that time is spent beyond seas, for "maintenance and better education." He was long in Paris, and considers the manners of the physicians there as "very polished and very good; as much so," he observes, "as the manners of those in other classes of society whom I met as gentlemen and educated persons." He believed them to be men of "high moral character;" as not "inferior to those in London;" and had "every reason to be perfectly satisfied" with "their education, with their manners and behaviour," though he would state that perhaps the education of the London physicians was "more classical and more general." This opinion of our Parisian brethren, in addition to great competence in all the branches of medical education, we have much pleasure in stating on the authority of Dr Wilson; more particularly as it is the fashion of fellows of the College to lay an almost exclusive claim to morals, manners, and liberal attainments.

Dr Wilson states at some length, the propositions for the improvement of the statutes of the College, which he brought forward, not only with a view to the conciliation of the licentiates, (for he conceives it impossible to go on well with the large body of licentiates opposed to their principles of government,) but in order to form the College into "a great medical body, which would form a Board of Health for the public, and would be generally of use to the entire kingdom."

His object is to get quit of the class of candidates, and inceptor candidates altogether; and to render all physicians who had been approved by the College, as fit to practise under its license, with the exception of such as practise midwifery, or dispense their own medicines, equally eligible to the fellowship after a certain period of probation, for instance four or five years; and that at such time they should be proposed for admission to the fellowship, and ballotted for as a matter of course, without further examination. He would not prevent fellows of the College from practising surgery, in as much as the practice of physic, by a statute of Henry VIII. includes surgery; but he would not admit a member of the governing body of the College of Surgeons to become a fellow, or one of the governing body of the College of Physicians to be a member of the Council of the College of Surgeons. Dr Wilson would wish to have the entire body of physicians in London represented by the College; the library and museum thrown open; and the whole establishment made as efficient and useful as possible. He would not anticipate any difficulty in the way of admission by the ballot, considering that the College differs from other corporations in being a body of highly educated men; nor should we do so, if the corporation feeling, with which the College has shown itself to be so amply imbued, were once fairly got rid of.

Dr Elliotson, Physician to St Thomas's Hospital, and Professor of the Practice of Physic at the London Universty, was next examined. This gentleman first graduated at Edinburgh, and then kept his terms, and graduated at Cambridge, from wishing to become a fellow of the College, this being, in his opinion, a higher grade, and more thought of than licentiates. He was not obliged to attend the College lectures in classics or mathematics, nor any medical lectures. He resided three years, and in three more took his Bachelor's degree in Physic, having then to write a thesis, but being subject to no examination. The discipline in this respect, he considers as having been much improved since his time, by Dr Haviland, the present Regius Professor.

He thinks the licentiates have a right to complain, that, as they have received as good a medical education as the fellows, and many of them as good a general education, the mere circumstance of their not having been educated at Oxford or Cambridge should give them less consideration than if they had been graduates of either of these universities. Edinburgh, in Dr Elliotson's opinion, affords great facilities for teaching Natural Philosophy and the sciences, and also classical literature; and though Cambridge graduates were generally superior in those departments to persons educated in Edinburgh, yet, if the latter were required, previously to their entering on the study of physic, to undergo examinations in those branches of knowledge, the education at Edinburgh would be in no way inferior to that at Cambridge. With all the improvements which could be made in the Cambridge system of medical education, Dr Elliotson has no idea that it can be at all equal to that of Edinburgh.

He is of opinion that the bye-laws of the College of Physicians require revision; and that any graduate who can pass such an examination as a fellow ought to undergo should become a fellow, provided he is as respectable a man as any other. The self-election of the elects he considers as barbarous, and not at all calculated for the present age; but to alter this a change in the charter is necessary. He speaks very highly of the character of Dr Wells, both as a physician and philosopher; and considers it inexpedient that the president should have the entire initiative in the introduction of licentiates to the fellowship.

Dr Elliotson does not think it desirable that any of the London schools of physic should have the power of granting medical degrees; but degrees in arts, he thinks should precede; and these might be given by the London University and King's College, and then a degree in physic, conferred by a board specially appointed for the purpose. But the College of Physicians, as in other countries, should, he is of opinion, be above all bodies that grant degrees, and have the power of examining a second time, in order to make the qualifications certain. He thinks that much of the system which attaches to medical practice in London is anomalous, and requires reform. Continental physicians, Dr Elliotson considers, are quite as well educated, and as well informed, as those of this country; but Oxford and Cambridge are not known abroad as schools of physic.

Dr Billing is a Fellow of the College of Physicians, and Physician to the London Hospital. He graduated at Trinity College, Dublin, and was incorporated at Oxford, but had no medical examination; nor did he produce any testimonial, or proof of moral qualifications from Dublin, but his diploma and a *bene decessit*, which latter he never knew of being refused. Dr Billing is of opinion that the exclusive principles of the College of Physicians are carried too far, and he narrates the share which he took in endeavouring to have the statutes made more liberal.

Dr Burrows is a Fellow of the College of Physicians, was a Fellow of Caius's College, Cambridge, and had a Tancred scholarship at that university. For taking a high degree as a bachelor of arts, great study and extensive acquirements are necessary; but a common degree can be provided for in a twelvemonth, and only requires common arithmetic, algebra as far as quadratic equations, the first Six Books of Euclid, Paley's Moral Philosophy, and Locke on the Human Understanding. He does not consider the fact of residence within the walls of a college as a test of moral character, nor thinks that the discipline of a university, independently of study, supplies an adequate guarantee for moral habits. The medical examinations required in Dr Burrows's time were slight and insufficient; but they have been of late much improved, and may now, he thinks, be regarded as a fair test of the student having acquired a proper amount of professional knowledge.

With regard to the College of Physicians, as at present constituted, Dr Burrows is of opinion that it is incapable of protecting either the interests of the public or the profession; that it is established upon far too exclusive principles, not leading to harmony among the different classes of physicians, nor commanding from the medical public the respect which it is desirable should be paid to it.

Dr Clendinning is a Fellow of the College of Physicians, and took the degree of Master of Arts at Dublin, and Doctor of Physic in Edinburgh. He took the degree of Doctor of Physic at Oxford in 1827, but underwent no examination; was asked for no certificate either of education or moral character or habits, and supposes that his Edinburgh diploma was considered as a sufficient certificate of medical knowledge. He kept an act which was a mere form; and read a thesis in the presence of the gentleman beadle alone, which he candidly admits was written for him, as it would have been a waste of time to take any trouble when the mere beadle was present to hear it read. Dr Clendinning considers it improper to confine admission into the College to graduates of the two universities, and among other changes which he considers as called for in the government of the College, thinks that the elects should be done away with, and that the President should be elected by the body at large.

Dr Sims is a Licentiate of the College of Physicians, and Physician to the Mary-le-bone Infirmary. He describes the examination to which he was subjected, on being admitted a licentiate, and states that seventy-seven of the licentiates living in London, signed the petitions presented to the Legislature for a redress of their grievances, of which copies were given in our Journal at the time of their appearance.* He considers that all men practising in London, under the 3d of Henry VIII., at the time when the College charter was given, were eligible to become incorporators, if they chose to be incorporated; and that the exclusion of any of such persons would have been improper. He considers the seven years' law, under which Dr James Sims and Dr Wells endeavoured to get into the college, as offering insuperable obstacles to admission; and that the division of the profession into fellows and licentiates, creates a chasm between the two parties, which it is difficult to fill up; and tends to produce a jealousy and dissension between persons who may have been at one time on intimate terms. By this division, fellows are disposed to assist each other, rather than licentiates, and have, in their corporate capacity, a bond of union which the licentiates do not possess. Dr Sims thinks, that, from the history of the College, there is no reasonable ground for supposing that it will reform itself. The petitioners wished the present distinctions to cease, and that the College should be put on a better footing, and by this means obtain an influence with the public and the profession, which it does not at present possess.

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* See Edinburgh Medical and Surgical Journal, Vol. xli. p. 255.

Dr Sims is of opinion, that there should be two divisions only in the profession; one, the higher, consisting of physicians and surgeons; the other the lower, comprising general practitioners;—that the student should have periodical examinations in the course of his education; that at a certain period of it, he should be examined for the inferior degree, by a united board of physicians and surgeons, and in three or four years subsequently, for the higher. The present division of the profession into physicians, surgeons, and general practitioners, he thinks should be abolished; for though the physician is confined to the practice of physic, yet nine-tenths of the surgeon's practice, and nineteen-twentieths of that of the general practitioner is medical. In Edinburgh most of the physicians were general practitioners at their outset; and Dr Sims thinks that physicians should be allowed in England, if they wish, to dispense their own medicines. It is a great advantage to the physician, that he does not perform minor operations in surgery; and families in moderate circumstances prefer employing the general practitioner, who embraces all departments, instead of a gentleman who acts in one capacity only. Dr Sims evinces in his evidence much acquaintance with the laws of the profession; with the various controversies which have taken place in it, and with the history of medical education and practice. He considers five years as necessary for the course of education of the higher departments of the profession, and enumerates the various objects to which the attention should be directed during that period.

Dr Arnott is a graduate of Aberdeen, a licentiate of the College of Physicians of London, and author of a well known and much esteemed popular treatise on Physics and Natural Philosophy. He considers that the charter of the College, which was originally intended to insure to the public the best medical service, has been entirely neglected, and the personal advantage of the members, or the corporate advantage of the body, alone attended to in the management of its affairs,—by which jealousies and bad feelings have been largely produced. He thinks an efficient reform in the College will take place only by compulsion, as persons rarely surrender voluntarily any usurped privileges.

He thinks there should be a high standard of education; and that it would be advantageous to the profession and the public, that the artificial divisions of practice, which now exist, should be done away; that there should be a board in London, composed of both physicians and surgeons, which might give the requisite qualifications to practise; and he appeals to the example of Scotland to show that a single standard of education which all the medical men of Scotland possess, does not produce a deficiency of number. He is of opinion that an augmented standard would elevate the rank of the profession, and thus compensate, as in the church, the army and navy, for small emoluments. He considers the superiority of the physician over the general practitioner, as consisting in a better preparatory education, by which he is enabled to see intelligently, and observe correctly;—and thinks the effect of the bye-laws of the College have been to restrict the number of physicians, and to force another order of practitioners into general pratice.

On the soundness of the later view of the subject we feel disposed to entertain some doubt. There has always been, and still is, a far larger number of physicians, both in the metropolis and the country, than have even a very moderate share of practice; and it seems, therefore, to be clear, that in this particular department persons are satisfied with the credit of belonging to a liberal profession, and with the rank given to physicians throughout the British dominions, as a portion of the remuneration to which they look in the choice and exercise of a calling. We doubt much whether, if all the divisions of the medical profession were abolished, and the whole of the immense mass which forms such divisions completely assimilated, the rank of the higher orders would be kept up to its present standard.

Sir David Barry graduated in Paris, and became a licentiate of the College of physicians in London, having commenced his general and medical education in Dublin. He enters into much detail as to the mode of education in the French metropolis; and with regard to the comparative rank of the medical profession there and here, he says, a medical man in Paris extends over a larger surface of society than in Great Britain. He may be among the most distinguished of French society; may be a Baron, Chevalier, or Peer of the realm, and have every advancement of society open to him, except royalty; but he is sometimes " a *docteur medecin*, living in a little alley with a board over his door, who will take a few francs, and walk half round the city to look after your health." One reason of this state of things is, that there is no such thing as an apothecary practising medicine in France.

Sir David Barry considers the standard of education to be higher in France than in this country; and views the examination at the College of Physicians, as very elementary and imperfect. He is favourable to allowing the public to make their own selection, as to the particular division of the profession which should be made; and to have one qualification for all the different practitioners of the British empire, which should not be so high as to operate as an exclusion. Wherever such qualifications may have been received, whether at Dublin, Edinburgh, or London, practitioners should, he is of opinion, be reciprocally allowed in each of the three countries, to avail themselves of the advantage of their certificates, having in every great town, a competent body, composed of the elite of the profession, to ascertain whether they were entitled to papers they possessed, and were fit to be put in charge of the public health.

He thinks there should be a central board, composed of the most distinguished persons in the three branches of the profession, to ascertain the qualifications of practitioners; which board should be originally designated by Government, and afterwards "continued by emulation." He points out many improvements which he thinks ought to be effected in all the divisions of the medical profession; and considers the exclusive privileges of the College of Physicians as very unfavourable to it.

Sir George Tuthill, a Fellow of the College of Physicians, and Physician to the Westminster and to Bethlem and Bridewell Hospitals, is of opinion, that the College does not merit the imputation of having acted with a view to corporate and individual interests; but, on the other hand, that its bye-laws have been made with a view to the advantage of the public, in requiring of its members the best education which the country can afford. The fellowship is not *confined* to graduates of Oxford or Cambridge, but merely a *preference* given to such graduates; and no inconvenience, in Sir George's opinion, has arisen from this preference, which has been sanctioned by the courts of law. It is for the advantage of the public, he thinks, that there should be a higher education for a part of the profession; otherwise, if there were but one kind of education, it could not be attainable by all, except it were of a very moderate description. The College, he is of opinion, is unjustly charged with a monopoly of medical appointments; and with regard to the endeavours of Sir Lucas Pepys to confine army medical appointments to the College, they were not successful, and were not sanctioned by the College, but were the act of Sir Lucas in his individual capacity. Sir George is aware of a letter having been transmitted in the year 1826, to the Principal of the University of Edinburgh, complaining that degrees were often conferred without residence; but knows not what answer was returned.

In this case a ticket is stated to have been taken out at the commencement of two successive seasons, and a testimonial in consequence given of two years residence, though the student quitted the university after taking out such tickets.

Dr Paris, Fellow of the College of Physicians, a Member of Caius's College, Cambridge, and late Physician to the Westminster Hospital, is, like Sir George Tuthill, a perfect optimist in college affairs; thinks the restrictive bye-laws just and reasonable, advantageous to the public, and improperly blamed by the licentiates. There is no " express restriction" in the charter, " but there must be one implied." Restriction " is not sanctioned by the charter decidedly, but the College," he apprehends, " possesses a power beyond that conceded to them by the charter." There was once an idea of proposing several licentiates, as eight or ten, for admission on the opening of the new College, but this fell to the ground. Sir Gilbert Blane declined being introduced by the special recommendation of the President. The College is very large as it is, and to bring in more than one licentiate every year would make it unwieldy; but he would not reduce the admission of Oxford and Cambridge men to prevent the undue growth of the College, though this would be an effectual way of accomplishing the object. Dr Paris declines answering the question, whether he does not think that the most qualified of the licentiates are not, generally speaking, men superior in point of education, both general and medical, to the least qualified of the fellows, who are graduates of the English universities. To be elected a fellow, a licentiate must be a " very prominent" man, but " it is a very different question," in a graduate of an English university, where there is " a guarantee of his preliminary education." He is aware that Lord Kenyon, who decided the College question against Dr Stanger, had been standing counsel to the College; but thinks this would not actuate his procedure on the Bench, and does not know whether it is customary, as was stated to be the case, for a Judge to decline acting as a Judge on a trial in which he had been concerned as counsel.

Dr Paris contends much for the universities as guarantees for moral conduct on the part of the students, from their being domiciled in college, though it appears that a large number of the students of Cambridge live out of college during even the whole period of their academical residence. The qualifications for a mere degree, he is obliged to admit, are very small; and though the university must be satisfied by a small modicum of qualification, and the College may possess themselves of an adequate knowledge of the acquirements of a candidate by examination, yet he would have matters left quite as they are. " The system has worked well," Dr Paris contends, "for ages," "well for the public," and done the licentiates "no injury;" for he does not know whether they (the licentiates) are better judges of what does them harm than the fellows.

When pressed with regard to the small acquirements requisite for obtaining the degree of Bachelor of Arts, as being not more than the first Six Books of Euclid, some of the simplest rules of algebra and common arithmetic, he says, that this sum of acquirements does not apply to persons who proceed in medicine; but yet the latter, he admits, require only the amount of acquaintance with literature, which is necessary for passing the "*little go*,"* and acknowledges, that a person "may pass through examinations, and obtain a degree, with a very moderate quantity of knowledge." He is, nevertheless, continually reasoning in a circle; and if he is pressed on the scanty quantity of *acquirements* necessary for justifying the College in giving a preference to graduates of English universities, he stickles for their *moral qualifications* which residence demand; and when he is shown that moral qualifications can, in many instances, hardly apply, then he contends for intellectual acquirements; so that Dr Paris is in the comfortable and happy state of complete satisfaction with the College, the universities, his own reasoning, and himself.

Dr Hume, a Licentiate of the College, and an Inspector General of Army Hospitals, found no practical inconvenience in being a licentiate, and therefore did not sign the petition; thinks the seven year law inoperative from the examination required; but never felt the degradation complained of in the licentiates' petition. The estimation of foreign, compared with English physicians, depends, he thinks, on the respectability of the individual; but with regard to the general estimation of the medical profession abroad, he considers it less, even in Paris, where he was physician to the Embassy, than in this country.

Dr Henry Holland, who was first a licentiate, and afterwards a fellow of the College, considers that the relation between the College of Physicians and the higher classes of the community places the profession in England, in reference to general society, higher than in any part of the continent of Europe, and thinks that the discipline of the English universities is favourable to subsequent studies; but at the same time is of opinion, that, besides the admission of Oxford and Cambridge graduates, there should be "a frank and general admission" of others who have become eminent in the profession. He is acquainted with "very many" licentiates who would do honour to the College; but yet he conceives that the admission of one licentiate in a year is as much as can reasonably be required, and thinks it might be better if the election were not altogether confined to persons nominated by the President. He feels much difficulty as to the best mode of paying apothecaries; but is of opinion, on the whole, that remuneration for attendance is the most expedient plan.

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* A slight examination, to which all students are subject in the second year.

Dr Stanger, who next appears before the Committee, is the gentleman who, nearly forty years ago, took legal proceedings against the College. He graduated in Edinburgh in 1783, became a licentiate in 1789, and applied to be admitted a fellow of the College in 1796. His evidence was principally directed to the proceedings in the trial in which he was engaged; but it is unnecessary to say much on this subject, as those proceedings have been frequently alluded to in this article, and have all of them been published. He thinks it more than possible, and deems it probable, that a president "might act capriciously" in the application of his power of recommendation under the ten year law. Mr Erskine, the College counsel, regretted that he had not been employed for Dr Stanger. His expression was, "I would wish exceedingly to be your counsel in this cause; but what can I do? I have a retaining fee. We are like hackney coachmen, first come, first served."

Dr Stanger represents the period of 1796 and 1797 as very unfavourable to a fair examination of the claims of the licentiates; because, at that time, everything which partook of popular principles was rather discredited. But there were other circumstances also which he considered as being adverse to his cause. "The bye-law," says he, "had been made (after Lord Mansfield's opinion was given) principally by Lord Kenyon, who was their chief counsel in making such bye-laws as would keep us out. In the next place, Mr Justice Lawrence was the son of the President of the College, and, therefore, he had been born and bred up in hostility to the licentiates. Mr Justice Grose was a Cambridge man, and Mr Justice Ashurst was a university man, and the feeling of the country was considerably against any kind of reform at that period."

Dr Tweedie, a licentiate of the College of Physicians, and a graduate of Edinburgh, was obliged to procure a disfranchisement from the Royal College of Surgeons of Edinburgh before he could be admitted to examination as a licentiate. He thought this hard and unnecessary, as he had paid between L. 250 and L. 300 to that body, and had the advantage, among others, of the prospect of L. 60 per annum to his widow. He likewise considered such obligation as illegal; but his disfranchisement was so managed as to be only nominal, and he keeps up his annual payments to the fund as usual.

Dr Tweedie was one of the licentiates who signed the petition to Parliament, and considers that the licentiates have a *right* to gain admission to the fellowship of the College.

Dr Copland is a graduate of Edinburgh, a licentiate of the College of Physicians, and is engaged in publishing a Dictionary of Medicine. His examination was principally directed to the comparative agency of fellows of the College, and of persons unconnected with that body, in the progress of medical science, and he decides in favour of the latter, though he mentions with approbation the College Transactions and the researches of some of the principal contributors to that work, particularly Sir George Baker and Dr Heberden. He thinks the Edinburgh degree is conferred too early; but that if this were corrected, and the four years' course now required were preceded by a good preliminary education, the education would be "extremely good;" perhaps the best in the "world, as it respects clinical instruction." He is of opinion, that the London hospitals might be made more available than they are at present to the advancement of medical knowledge; and that the keeping better registers, and the furnishing reports, would be important in this way. He thinks the licentiates have a right to complain of the exclusive enactments of the College, which tend to give an undue advantage to its fellows, and to produce and foster an *esprit de corps*, which is unfavourable to the profession generally. He conceives, that all physicians who are well educated, and graduates of respectable universities, should be placed on a footing of equality; that the whole system, as respects the different branches of the medical profession, should be altered "without, however, abolishing the colleges," and that the latter might be "so reformed, amalgamated, and placed under the government of a body in connection with the State, as to be rendered more useful to science and to the public."

Dr Henderson, a graduate of Edinburgh, and licentiate of the College of Physicians, made an attempt to obtain access as a right to the College Library some years since; on the ground that this was provided for by the bye-laws of 1765; but he was unsuccessful in his application, being informed, that he could only obtain books through the medium of a fellow. He signed the petition of the licentiates, and has attended much to the history of the College, though he does not appear to have been aware, that the Court of King's Bench had given an opinion in favour of the bye-laws, which were the subjects of reprehension in the licentiates' petition. Dr Henderson is of opinion that the licentiates are improperly deprived of advantages derived from a connection with the College, but is unable to point out satisfactorily what description of reform is most likely to benefit the public, from not having paid sufficient attention to the subject. He thinks the College could, by examination, get adequate information as to the qualifications of persons appearing before them, and that the graduates of Edinburgh are fully equal in all respects to those of the English universities, except that they have not devoted so much time to classical studies.

Dr Farre, licentiate of the College of Physicians, and Physician to the Ophthalmic Hospital, practised as a surgeon and accoucheur previously to becoming a physician, and hence is now called in, indifferently, to every description of case. He did not sign the licentiates' petition; is unacquainted with the College bye-laws, and would not accept the fellowship of the College if it were offered to him, though he afterwards says, that he would do so, if he were placed in his proper standing, and not put below some that he had contributed to educate. He admits that there is something honourable in a fellowship, from which licentiates are excluded, because he has educated two sons as physicians at Cambridge, in order to their becoming fellows of the College. He considers it as eminently disadvantageous to the profession of physic, that the physician has lost the anatomical character which he so long possessed, and thinks this is "partly owing to the fault of the College." "Originally, the surgeon derived his anatomy from the physician; and we are indebted to a Harvey, because anatomy was once honoured in the College of Physicians: but when anatomy became disregarded, and the College had thrown away the source of rearing other Harveys, John Hunter arose, and carried off the palm of surgery." "By neglecting anatomy," continues Dr Farre, "they have lost their stronghold on professional knowledge, and they can only regain it, by encouraging the cultivation of surgery and anatomy, both practical and morbid, and also midwifery; in order that the physician may be not only enabled to maintain his station, but also be qualified for the office of a consulting physician."

Sir William Knighton was a licentiate of the College of Physicians, and is retired from practice. He is little acquainted with the charter and bye-laws of the College; but though he never felt aggrieved in not being a fellow, and thinks there are no instances of professional failure which can be fairly attributed to a want of the fellowship, he thinks that education at an English university gives some advantages to a London practitioner.

Dr Birkbeck, a licentiate of the College, a graduate of Edinburgh, and formerly Andersonian Professor at Glasgow, signed the licentiates' petition, and is of opinion, that there are no grounds, in the charter of the College, for the exclusive principles on which it has acted—exclusion, according to Dr Birkbeck, began in the year 1581, when the fellows were improperly limited to twenty; but the College was compelled to abandon that bye-law, and then, "having once tasted the sweets of exclusion," afterwards, under another form, continued the practice of it, which he considers as quite repugnant to the charter. Pecuniary rewards are not, he thinks, much affected by the exclusion; but the desire of the honours of the profession is necessarily much repressed by it; and there is an influence exercised by fellows of the College, in favour of each other, which the licentiates have no chance, by their want of union, of overcoming.

Dr Birkbeck is of opinion, that much greater attention should be paid, than at present, to the preliminary part of education, to the acquisition of general science; that there might, with advantage, be a degree for general acquirement, and another for medical qualification; that less than four years for either department would be insufficient; and that the possession of a degree, after proper examination, should entitle a person to practise as a physician without a second examination. He thinks that degrees might, with great propriety, be conferred in London, by a board composed of gentlemen from the various medical schools; from the College of Physicians, if it existed on "a broad and liberal principle;" from the College of Surgeons; and from the Apothecaries' Company; and to the whole might be added a scientific layman, to take care that no scientific prejudices prevailed. Dr Birkbeck thinks the College has worked tolerably well for some of its fellows, though much less than a more liberal College would have done; but "it has, in his opinion, neither worked well, nor worked at all, for the public."

Dr James Johnson is a licentiate of the College, and editor of the Medical Review; but he never graduated in any university, having received his medical education in London, and been much abroad. He states having been threatened with a citation before the College for some comments on its charter and bye-laws; but this never took place. He considers the licentiate as having a real substantial grievance, by not being admitted into the fellowship; that he is in an inferior rank; and that his professional success is thereby affected. He thinks the College examinations no test of medical qualifications, the whole three lasting only twenty-eight minutes altogether; and that the examinations to which he was subjected, previously to entering into the navy, at the College of Surgeons, and the Navy Board, were "infinitely more difficult to get through." He considers that a uniform and pretty high standard for all medical men would be useful; but that there might be two ranks, the higher, for "a longer course of study, for a higher degree of classical, mathematical, and general knowledge," and in this there should be an exclusion from dispensing medicines; a lower, with a smaller portion of those attributes, but with a distinct understanding, that any one of the lower rank should have it in his option, at any subsequent period, to submit himself to examination, and pass into the higher. Morality and good conduct are not confined to Oxford and Cambridge, and "it is not generally supposed that these are the best soils for the culture of such qualities." The regulation of medical education, and the superintendence of the practice of the profession, Dr Johnson thinks, should be centred in a board, composed of the most eminent men, belonging to the College of Physicians and College of Surgeons, selected, in the first instance, by government; or if that were not deemed advisable, appointed by free and open election, from the fellows and licentiates of the College of Physicians, and from the College of Surgeons.

Dr James Clark, a licentiate of the College of Physicians, and Physician to St George's Infirmary, comes next. He belongs to the Association of Licentiates, and was formerly an extra licentiate of the college, the examination for which (a single one) was much slighter than those for licentiate, without there appearing any sufficient grounds for the difference. He has seen much of the medical education of France, Germany, and Italy, and from his knowledge of the physicians of those countries, which is considerable, he does not consider the latter as at all inferior to those of England in general information or medical acquirements. The hospitals abroad are visited more frequently, and the registers are better kept than those of this country, and hence, in Dr Clark's opinion, they afford better means of medical instruction. He considers a good preliminary education as important for the physician. It is an advantage being a fellow of the College, and there is no reasonable ground for the fellowship being so much confined to graduates of the English universities as is now the case. Competent knowledge, after a proper medical education, may be ascertained by examination; and moral qualifications, either by inquiry or by the acquaintance afforded by a certain degree of residence or continuance in practice.

Dr Ramadge, a Fellow of the College of Physicians, was educated at Dublin, where he took his Bachelor of Physic's Degree; was afterwards incorporated at Oxford, and received his Doctor's degree there, but without more than certain forms being gone through.

Dr Haviland, Fellow of the College of Physicians, and Regius Professor of Physic at Cambridge, has introduced many improvements into the medical studies of that university since his appointment in 1817. At that time no attendance on medical lectures was necessary, and all that was required in taking a Bachelor of Physic's degree, was to pass such an examination as the Regius Professor choose to subject the candidate to, after his having been on the board of one of the colleges the requisite time, and having kept nine terms, which required a residence of the major part of each of the three terms of three years of that period. * By the changes introduced by Dr Haviland, it is now necessary that the candidate should be examined not only by the Regius Professor of Physic, but by the Professors of Anatomy, Chemistry, and Botany; and that he should have previously attended one or more courses of each of these professors. He may take his degree at any time in the sixth year from his having entered the university, which may sometimes be in little more than five years, and sometimes in near six, according to the particular time when he entered. During the first year and half of his academical studies, it is necessary for the student of physic to attend the College lectures, that is, the usual instruction given by the College tutors in classics and mathematics, &c. must then pass the *little go*, and afterwards, if he choose to devote himself to the studies of his profession, he is excused any further attendance on the College lectures. He is absolved from the necessity of residence at the university after he is of standing sufficient to take his Bachelor of Arts degree, when he becomes, in university language, a *Harry-Soph*, † and need not make his appearance till he come for examination for his Bachelor of Physic's degree.

From this account of the present studies of Cambridge, it therefore appears that the minimum qualifications for a Bachelor of Physic is a year and a-half's attendance on the College lectures, embracing general literature, and a single course of each of the professors above-mentioned, which is hardly enough to fill up the remaining period of his university residence. We do not at all mean to say that this is ordinarily regarded as a

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* Our readers may feel it desirable to be informed, without the trouble of reference, of the designations and periods of academical terms at Oxford and Cambridge, of which there are four at the one university and three at the other. We therefore annex them as applicable to the present year.

	Oxford.		Cambridge.	
	Begins.	*Ends.*	*Begins.*	*Ends.*
Hilary, -	Jan. 14	April 11	Jan. 13	April 10
Easter, -	April 29	June 6	April 29	July 10
Trinity, -	June 10	July 11		
Michaelmas, -	Oct. 10	Dec. 17	Oct. 10	Dec. 16

† A student of the first year at Cambridge is called a *Freshman*; of the second, a *Junior Soph*; and of the third a *Senior Soph*. The Harry-Soph 'Αιϛ-soph, must, we presume, be regarded as implying a higher description of the genus. Harry-Sophs are students in medicine whose standing in the university exceeds that required for obtaining the degree of B. A.

sufficient medical education, because the medical students of the English universities invariably go elsewhere for the prosecution of their medical studies; but the course of academical occupation now mentioned is the whole of the much vaunted education, both general and professional, for a physician, even in the present improved state of things, which is to set at nought every endeavour made in other quarters except Oxford and Dublin to equal it, and all the acquirements of the most diligent and erudite members of other universities.

After the present year, it is necessary that during the period of Harry-Sophship, the students should have attended the practice of an hospital for two years. When the degree of Bachelor of Physic shall have been received, a license under the university seal is necessary to enable the graduate to practise, which may be given the term subsequent to receiving the Bachelor's degree, but the applicant must have previously passed through a practical examination before the Regius Professor of Physic, and another Doctor, generally the Professor of Anatomy. The degree of Doctor is conferred in ten or eleven years from entering the university, the precise period depending on the month of admission, but the proceedings, on taking this degree, are very much a matter of form. If an application is made for a doctorate, by one who has not previously obtained a license, it is given him without his being subjected to the usual examination for a license, because it is thought scarcely necessary to examine a man of that standing who had previously been examined at the end of five or six years when admitted to his Bachelor of Physic's degree. A degree of Doctor does not, however, confer a right to practise the profession. This is given by diploma without examination, by virtue of a grace or decree of the Senate. It was formerly the case that a student going out in arts, and taking his Master of Arts' degree, lost four years in his medical career. He did not take any Bachelor of Physic's degree, but went on at once from Master of Arts to Doctor of Physic, with the intermedium only of a license to practise, which might be received in two years after obtaining the degree of Master of Arts. Now, however, encouragement is given to taking the degree of Bachelor of Arts, but this does not prevent the reception of the degree of Bachelor of Physic at the usual period. The Bachelor, therefore, goes on to the degree of Doctor of Physic without the necessity of taking the degree of Master of Arts.

A Master of Arts cannot take the degree of Doctor of Physic, unless he declare his intention of proceeding in physic, before the expiration of his fourth year from entering the university. He may take out a license to practise in two years after taking his master's degree, and in five more he can take his doctor's degree, making a loss of four years in the period at which such degree can thus be obtained. He is not required to furnish any evidence of having attended hospitals or lectures previously to his examination for his license; because it is thought that, as he is a man of standing, and often a person who has distinguished himself, the mode of acquiring professional knowledge may be safely left to himself. He is *supposed*, however, to have been engaged in the study of his profession from the time of taking his Bachelor of Arts' degree. For the Bachelor of Physic's degree, the candidate is examined in some Latin authors, and in Hippocrates; for the license, in Aretæus.

A person coming to the university at an advanced period, as 40, with a wife and family, would have the discipline of the university very much relaxed by the tutor; but a degree from Edinburgh, or any other place but Oxford or Dublin, would not be considered as justifying such relaxation.

John William Willcock, Esq. a Chancery, and formerly a common law barrister, the author of a work on Corporation Law, and of another on the Laws Relative to the Medical Profession, was next called before the Committee. He is of opinion, that all persons legally practising in London at the time when the charter of the College of Physicians was given, had a right to become a member of the body corporate; but after the granting of the charter, no one could obtain admission except by election. The fellows were free "to increase their numbers to any extent, and from any sources they may think proper." They could not limit their number; and when they restricted their election of fellows to graduates of Oxford and Cambridge, they imposed a qualification not required by the charter and act of corporation, and therefore illegal. The modifications made in this law were still illegal, as implying a restriction in the right of admission. Even "a certain mode of education, as a test or qualification," though not equally objectionable, is still considered by Mr Willcock as illegal. He does not think that the election of the Duke of Richmond and Duke of Montagu as fellows in 1771 was legal, because they were not men of the medical faculty of London. He is of opinion, that a clergyman elected into the College becomes liable to ecclesiastical censure, and that a physician, a professor of an English university, neither practising in London nor intending to do so, cannot be lawfully elected into the fellowship. The College of Physicians might refuse a candidate for a license to renounce another corporation; but could not prevent the practice of surgery in either fellow or licentiate.

No licentiate can claim to be admitted into the College, except on an election by the fellows, who may elect "whatever competent persons they please," and "cannot be compelled to come to an election." If a majority of the fellows resolved to exclude, by a private arrangement among themselves, all candidates but such as were graduates of the English universities, they might do so, though there might be a ground thus laid for repealing the charter. Mr Willcock does not agree in the correctness of the whole of the statements made in the petition of the licentiates. He does not concur in the opinion, that "all physicians entitled to practise in London are equally entitled under the charter to admission to the fellowship of the College," nor does he think that the "fellows have usurped" all the privileges "attached to the College. The licentiates," he says, "have no power of getting into the College but by election; and, as the fellows constitute the members of the College, that cannot be usurpation." With regard to Lord Kenyon's judgment in the case of Dr Stanger, Mr Willcock thinks it quite possible that Lord Kenyon might have such a bias, as to make him "forget the principle of law," though on a point which was "against plain law," his judgment would have no bias. Still, however, he is of opinion, that his Lordship's judgment was right, though on wrong grounds; and from the whole of his evidence we are led to infer, that the College of Physicians is considered by him as possessing complete irresponsibility, and that, provided they make no laws which can be brought forward against them, they may act as they please. Mr Willcock is sometimes indistinct, occasionally speaks with indecision, and now and then with imperfect knowledge or recollection; but if he is right in the opinion thus given, there has been a very singular and long-continued succession of misconceptions on the subject.

Sir Charles Clark, a licentiate of the College of Physicians, was appointed under a special law, empowering the President to propose a person as a licentiate who had not resided at a university. He gives an account of the formation and objects of the Obstetric Society; and states at length what he considers as included in the term midwifery. The object of the society (which has not yet been accomplished) was to induce the medical corporation to take cognizance of this part of the profession, and to examine candidates for a license to practise as to their knowledge of the principles and art of midwifery. Sir Charles Clark considers that the objection against admitting practitioners in midwifery as fellows of the College of Physicians is invalid. The public, he conceives, estimates the respectability of any branch of the profession by the advantage derived from it; and with regard to liability to calls as rendering an accoucheur physician less efficient for the performance of certain duties in the College, this must happen occasionally to every well employed member of the profession. With very few exceptions, all the works of merit in midwifery and the diseases of women and children have been derived from licentiates of the College, or surgeons not members of the council. Sir Charles Clark does not think that midwifery should form a separate branch of practice. Physicians and surgeons both exercise this department; and should be required previously to ascertain their competence by examination. Though operative surgery is entirely confined to surgeons, yet there are many operations of the most serious nature which attach to the practitioner in midwifery, as the Cæsarean operation, excision of the *uterus*, and tapping the brain in *hydrocephalus*. Sir Charles Clark was invited by the President of the College to become a licentiate, and was, previous to his admission, obliged to disfranchise himself from the College of Surgeons, of which he was a member.

Sir Charles Bell, a Member of the College of Surgeons, and Surgeon to the Middlesex Hospital, published a letter in 1824, in which he advocated the opinion, that the situation of physician or surgeon to an hospital should be a reward for professional merit, and deprecated the practice of young men, being appointed physicians and surgeons to hospitals, and quitting those situations on getting into good practice. He thinks older physicians should be appointed to hospitals, and not those at the bottom of the list; and is the more strongly impressed with this opinion, from having seen, in Edinburgh, Drs Hamilton, Gregory, and Rutherford, men not inferior in age, reputation, and influence, to the President and Seniors of the College of Physicians, prescribing in the hospital, and giving reasons for their practice. He considers the influence exerted by fellows of the College in favour of junior members of their own body as disadvantageous to the profession.

Dr Locock, a Licentiate of the College of Physicians, Physician to the Lying-in-Hospital, and Physician Extraordinary to the Queen, agrees with Sir Charles Clark in every opinion expressed by him; but he thinks the exclusion of practitioners in midwifery from the fellowship of the College of Physicians, or the Council of the College of Surgeons, hard and improper. Dr Locock signed the first petition of the licentiates, but not the second, because he thought that, as the College were beginning to reform themselves, reform was best left in their own hands, though he would not venture an opinion as to "whether they deserved to be trusted with such power of self-reform."

Dr Yelloly, a Licentiate of the College of Physicians, formerly Physician to the London Hospital, and now retired from practice, was first examined as to the nature of the opposition made, many years since, to the grant of a charter to the Medical and Chirurgical Society. From the details which are given, it appears, that not only did the College oppose the petition for a charter, but made a resolution, which was considered by the then Solicitor-General to be an illegal one, by which the fellows were prohibited from furthering the object in any way, without permission of the College. Some injurious imputations which were thrown out very harshly and uncandidly against the promoters of the charter, on the ground of their having employed, without authority, the names of Sir Henry Halford and Dr Baillie in the proceedings, were shown to be entirely unfounded, by letters from both those gentlemen, addressed to Dr Yelloly, and the late Dr Marcet, which are printed in the evidence.

In the course of his examination, Dr Yelloly had occasion to notice the unfitness of the College to command the confidence of the public, so as to form a popular channel for publication, notwithstanding the respectability of the few volumes of College Transactions which have hitherto appeared. By not being the exclusive body which it now is, the College, he thinks, would be more useful; the licentiates would not feel themselves in the present state of vassalage; and the College, instead of being viewed as a body existing very much for itself, would be considered in the light of a parent or elder brother in the profession, and thus unite the whole of "a large, respectable, and high-spirited body of men" in its objects. Dr Yelloly considers the principle of exclusion as incompatible with the spirit of the charter, by which the whole "mass of physicians" practising physic in London at the time of its being granted, were "deemed worthy of forming a part of the new incorporation, however and wherever educated, even without any examination into their fitness." There is no example, he states, of the existence of such an exclusion in any other profession, or in any corporation of the country, literary, scientific, or commercial; and if exclusion from the legislature gave dissatisfaction to the Roman Catholic in the case put to him, the licentiate has, he thinks, much more reason to feel aggrieved; "for if a Roman Catholic should have happened to change his creed, he would immediately have acquired the eligibility of a legislator; but for the licentiate" nothing is considered as sufficient to "expiate the crime of his happening, by no fault of his own, to have been educated at one place rather than another." In the law, and in the navy and army, there is a certain saving of time to such as have had the advantage of college education, or of having passed through naval or military academies; but this is all; and there would be no objections in Dr Yelloly's opinion, if the physician who might have his degree early, should wait some time before he had the full honours of the profession. A licentiate, or person circumstanced in education as he is, would, Dr Yelloly thinks, have no difficulty in meeting the necessities of any examination which might be required of him in common with an Oxford or Cambridge graduate; but it must be "at a fair period of life," for "he must be a very bold man" who would volunteer such an examination, "in middle age, after long engagement in practice, and the examination conducted not before a small and sworn body of censors, to whom a man may securely confide his honour and best interests, but before the body at large."

"A licentiate is not examined in Greek; but if young men knew that they would obtain a higher rank by possessing a fair knowledge of that language, they would," Dr Yelloly feels convinced, "prepare themselves accordingly, or for any other trial of their qualifications to which they might be required to submit. The very omission," therefore, "occasions a deficiency."

Dr Yelloly considers the fellowship of the College in the light of one of those "little feathers, which in physic, as in other liberal professions, where it is not the mere money-making object which induces a man to enter it, must often supply the place of more solid advantages; and thinks that this sort of feather, though perhaps little known to the public, operates on physicians, just as silk gowns do on lawyers, or as orders and medals do in the army and navy, or among diplomatists, in exciting the energies, and stimulating the exertions of honourable minds." He thinks that in physic, as in law, there is a sufficient "inducement and reward" for obtaining an education at an English university, without the acquirement of any exclusive privileges, "in the additional credit which the possessors of higher attainments in literature and science receive with the profession and the public, and in the habits of acquaintance with the higher orders of society, which are so advantageous to a person settling as a physician in London."

He considers the College of Physicians as having acted with great impolicy, in refusing the Hunterian Museum when offered to them; and is of opinion that, "instead of taking every fair and legitimate mode of bringing themselves respectably before the public, they have reposed on their dignities, and not minded what became of the profession generally." The possession of the Hunterian Museum, he thinks, "afforded the means of recovering some portion of the ground which had been lost. Up to the early part of the last century, the College was distinguished for anatomical knowledge; and Cheselden, in the dedication of his work on Anatomy to Dr Mead, speaks of having owed his anatomical knowledge principally to the lessons of that eminent physician." By accepting this valuable museum, they might have become an imposing body before the public, instead of giving up so great an advantage to the College of

Surgeons, who have so well known how to avail themselves of it for their own honour, and the public advantage." The College of Surgeons acted, as Dr Yelloly thinks, with an admirable knowledge of the human mind, in making no invidious distinctions in the designation of their members. The humblest country surgeon feels an inducement to join the College by finding himself entitled, on receiving his diploma, to the title of "member" equally with the highest of the profession. But the College of Physicians, by appropriating the slighting appellation of "permissions," to ordinary admissions, prevents country practitioners, many of whom are "eminently distinguished as authors, and for their learning and elegant acquirements," from volunteering a connection with the College, which they would otherwise be glad to do; and thus, as appears to Dr Yelloly, the College is prevented from being able "to exercise a creditable and advantageous influence" over the whole profession throughout England, "and is thus prevented from being a large and united body," and from possessing that "wealth which members only can give," and which would enable them to keep up their library, and to carry on every other object with credit and efficiency.

In former times, the exclusive bye-laws of the College were not strongly felt, because there was a ready power of obtaining incorporation into either of the English universities; but this was given up long ago by the universities on the application of the College, without the universities seeming to "appreciate the hardship which they would inflict on many deserving and well educated men by so doing."

Dr Yelloly represents the great importance of correct and comprehensive hospital registers in medical statistics; and states how unfavourable to the interests of humanity is the very inadequate compensation given to general practitioners for their attendance on parishes. He mentions, on being asked relative to this point, having applied by letter to Dr Frampton, one of the College elects, for the loan of a little work of Cheselden's (the appendix to the third edition of his Anatomy,) which was necessary to elucidate an inquiry growing out of an investigation connected with calculous diseases, which was published by him in the Philosophical Transactions; but was informed in reply, that the request could not be complied with, as no books were allowed to be taken out of the library but by Fellows. Dr Frampton was a day or two afterwards examined as to this point, and admitted the fact; though he stated that the application was made in an irregular way, by a mere verbal message through a person whom he did not know. This assertion obliged Dr Yelloly to apply to the person whom he employed to deliver the letter, and this person perfectly recollected its delivery into Dr Frampton's hands. The facility, therefore, of getting books from the College library through a fellow would not be so easy as many of the deponents have represented it, if all the fellows were generally of opinion, as Dr Frampton seems to be, that it was advantageous to the College to throw difficulties in the way of making the library useful.

Dr Harrison, a graduate of Edinburgh, gave an account of the measures which he adopted on the subject of medical reform, in consequence of a resolution of the Benevolent Society of Lincolnshire, held at Horncastle in 1804. In 1811, he ceased to pursue the business any further, because, though he found a great desire for medical reform in some quarters, all the medical corporations were hostile. Dr Harrison settled in London in 1820, and was prosecuted by the College in 1828. He declined applying to the College for a license, because he conceived the position of the College to be unconstitutional and illegal. He states that in 1806, the College attempted to extend its jurisdiction into the provinces but without effect.

Dr Kidd is a Fellow of the College of Physicians, and has been many years Regius Professor of Physic at Oxford. Up to the year 1781, he states that a student must have graduated as Bachelor and Master of Arts, and must have been three years a Master of Arts, before he could take the degree of Bachelor of Physic; but in that year, the three years were diminished to one, so that eight years were required to become a Bachelor of Physic; and a license to practise was given immediately on taking the Bachelor's degree. Up to the year 1781, *four* years intervened between the degree of Bachelor and Doctor of Physic; but the period was then reduced to *three* years, which it continues to be. A Doctor's degree could therefore be taken in *eleven* years from the time of entry, which, before the above changes, required *fourteen* years. A short time, however, previous to Dr Kidd's examination, a further change was made, by which a person could take the degree of Bachelor of Physic in twenty-eight terms, or seven full years from his entering the university, without the intervention of the degree of Master of Arts; and in this way, with the similar interval of three years between the degree of Bachelor and Doctor, the whole period necessary for taking a Doctor's degree is reduced to ten years. The period of actual residence, however, only extends, as in Cambridge, to the time of taking the Bachelor of Arts degree, or to about three and a-half years.

No medical education is required to be prosecuted at the University for a medical degree; for since the period that there were greater facilities at London, Edinburgh, or elsewhere, for such studies, the statutes enacting them became obsolete ; and it devolved on the Professor of Physic to satisfy himself of the competency of a candidate for a Bachelor of Physic's degree, and upon his testimony the degree was granted. The Regius Professor and one Doctor must sign to the fitness of a candidate for a license; or if the Professor did not sign, the testimonial of three Doctors of Physic was then necessary. The public exercises, whether for a Bachelor's or Doctor's degree, are most candidly stated by Dr Kidd to be quite matters of form. The Theses for the Bachelor of Physic are often provided by the beadle; and the *sex lectiones* for Doctor, which are read on two succeeding days, are furnished, just as the individual pleases; for nobody is present but himself and the beadle.

Under the new statutes, the Professor of Physic is to have certificates of attendance on some sufficient school of medicine; but this regulation, Dr Kidd states, has been made out of deference to public opinion, and will produce no practical difference in the medical education at Oxford.

From the evidence given by the Regius Professors of Physic of Oxford and Cambridge, and from the practical applications afforded by other gentlemen of both universities, who appeared before the Committee, our readers will be able to form an idea of the nature of the education provided for physicians in those establishments, and how far it bears the character of that pre-eminence which is assumed for it.

Dr Haviland admits the deficiency which long existed in Cambridge in the studies of the medical profession, and has endeavoured to supply it. Dr Kidd equally admits the deficiency as applicable to Oxford; but he considers that the student must not look to that university for information in his profession, but go elsewhere for the purpose; and, therefore, still wishes to confine him to the general studies of the place during the whole period of his residence, believing that he may, on the completion of such residence, be safely trusted with the selection of the place for pursuing his professional studies, and the mode of conducting them. We are inclined to consider Dr Kidd as taking the more correct view of the subject; for with every respect for the zeal, ability, and regard for the honour of his Alma Mater, which Dr Haviland has so strikingly exhibited, in the changes effected by him in the medical education of Cambridge, there is this important defect even in the improved arrangements of that university, that they diminish to one-half the period of general education, while they do not allow sufficient time for the acquisition of professional knowledge. The prosecution of two systems of studies, to be pursued during the time of residence afforded to one, namely, three years or three years and a quarter, evidently precludes the appropriation of sufficient time for obtaining due proficiency in either. It therefore becomes a question, whether, in attempting to make Cambridge a medical school, the medical studies should not, consistently with the principles contended for, be preceded by the usual course of general education afforded to all professions at that university. Some of the medical students, Dr Haviland indeed states, remain a year or two at College after taking their Bachelor of Arts' degree, for the purpose of attending the necessary medical lectures, and this seems to be the only proper means of insuring any thing like adequate efficiency to either plan; but after all, does Cambridge afford equal opportunities with London and Edinburgh, for studying the various branches of medical science, and particularly practical anatomy? If it do not, there is then no good reason, after completing the usual residence for general education, for not going at once to the best place of medical education, leaving it to the professors to ascertain, by examination, at the proper period, the qualifications which are necessary to justify a recommendation for a degree. But if by any future arrangements, Cambridge can be made so far to compete with London and Edinburgh, as to warrant the appropriation of a certain distinct portion of time for the prosecution of medical studies there, in addition to the usual period of academical residence, then it would be desirable, that the courses should be more continuous and extensive; that more than one course of each branch should be required; and that the plan of hospital practice, both medical and surgical, and the system of clinical instruction, should be, as much as possible, assimilated to those of Edinburgh.

Dr Frampton, an elect of the College of Physicians, and Physician to the London Hospital, gave the statement mentioned in Dr Yelloly's evidence, relative to the book which the latter wished to have from the College library through his means. He is of opinion, that the method which is pursued at the London Hospital, of the medical lecturers electing each other, is an unfavourable one, and that the officers "should have the privilege, each of lecturing if they chose, in the order in which they stand." We do not see, however, how this right of lecturing, at the will of the individual, from his own estimate alone of his capacities or energy, would be at all compatible with the success of a school; or how it is reconcileable with what Dr Frampton contends for afterwards, namely, an election by the whole of the medical officers; or a recommendation by such medical officers, to the governors at large, for their sanction and appointment.

We have thus laid before our readers a pretty ample account of the more material parts of the evidence relative to the Royal

College of Physicians of London, which was taken by the Committee, of which Mr Warburton was chairman. In our next Number, we shall give an analysis of the evidence which respects the Royal College of Surgeons. Mr Warburton has not yet followed his labours by the introduction of any plans of professional improvement into Parliament; but he promises to do so early in the next Session. In the meantime, the College of Physicians have been altering their bye-laws; and it may perhaps devolve upon us at some future period to examine how far those changes are likely to be satisfactory.

ART. III.—*Medico-Chirurgical Transactions, published by the Royal Medical and Chirurgical Society of London.* Vol. xix. London, 1835.

SINCE the period of our last noticing the Transactions of the Medical and Chirurgical Society, that respectable association has had the honour of receiving His Majesty's Royal Charter of Incorporation; and the present volume is the first publication which has appeared under the charter. We have often had occasion to notice with approbation the objects of the Society, and the respectable manner in which these objects have been carried into effect; and we have only to express our best wishes for its continued prosperity and usefulness.

Prefixed to the volume is a copy of the charter and bye-laws of the Society as an introduction.

We shall follow our usual practice of distinguishing the papers according to the subjects of which they treat.

In Physiology we find one paper, viz. On the Functions of the Fœtal Kidney, by Dr Robert Lee.

Notwithstanding the uncertainty which has hitherto existed as to the functions of several of the organs of the fœtal system, the author considers it established by several facts which he brings forward, that the kidneys of the human fœtus, like the liver, intestinal canal, and thymus gland, are in a state of activity, and perform each their respective function prior to birth.

In the department of Animal Chemistry we have a paper by Dr Bostock, on the Chemical Constitution of Calcareous Tumours of the *Uterus* and other parts.

The result of Dr Bostock's experiments showed that these substances resembled in composition those which had been examined by various chemical philosophers, being composed of phosphate of lime and animal matter generally united to a small quantity of carbonate of lime. In one specimen taken from the *uterus*, the carbonate of lime predominated, and in two others there was a small portion of sulphate of lime.

In the department of Medical Pathology we find nine papers. The first of these is, a Case of Abdominal Tumour, with the Appearances on Dissection, by Mr Howship.

This tumour occurred in a coachman of 70, with an inguinal *hernia*, who had long passed bloody urine, with some pain and difficulty. He had likewise frequent *tenesmus* and purging, with *prolapsus ani*. The tumour, which was discovered only about three weeks before his death, occupied the left side of the *abdomen*, from nearly the cartilages of the ribs above, to the margin of the pelvis below. It was round, elastic, and apparently encysted; but on particular inquiry it was found to have been forming for eight or nine months previously, and to have induced aching and acute pains in the left leg and thigh, in which latterly the patient became entirely lame and helpless. A few days previous to death he had violent pain in the tumour, with involuntary motions and delirium.

Upon inspection after death, it was found that the tumour was encysted, was eight inches in length and nineteen inches in circumference. It was attached to the spine, and seemed to be an enlarged lumbar absorbent gland. It was formed of several cysts communicating with each other, and was filled partly with thick purulent matter, but principally with grumous bloody fluid. There was an extensive deposit of medullary or fungoid matter in the cellular tissue, behind the *peritoneum* lining the *sacrum* and cavity of the *pelvis*, which thrusting aside the *rectum*, pressed on the bladder, induced disease in its coats, "forming a broad cushion, with a highly vascular and hemorrhagic surface intruding itself into the cavity of the bladder," and hence, of course, giving rise to the *hæmaturia*, with which the patient had been affected.

The second article in this department is a Case of Pulmonary *Phlebitis*, by Dr Robert Lee.

A female of 20, five days after delivery of her first child, was attacked with *dyspnœa* and pain in the left side of the chest and over all the abdomen, with a rapid pulse. The symptoms went on with various degrees of severity; and she had latterly cough, with mucous expectoration. She died a month after delivery.

Upon inspection after death, in the folds of the broad ligament of the *uterus* near the left *ovarium*, an abscess about the size of a walnut was discovered. The veins in the *uterus* and neighbourhood, the iliacs, and the whole of the *cava*, were lined with yellow *coagulum*, or a soft yellowish mass of lymph and pus. The venous trunks of the left inferior lobes of the lungs had all the appearances usually seen in inflammation of veins, and the lobe itself was dense and of a dark-red colour. The serous surface of the middle and inferior lobes of the lungs on the right side was covered with soft yellow lymph, and their substance was hepatized. Inflammation of the *pleura* and lungs are one of the most fatal and frequent consequences of uterine *phlebitis*; but this is the only instance which has come under the cognizance of the author, of inflammation of the veins returning the blood from the lungs to the left side of the heart.

A case of Laceration of the Peritoneal Coat of the *Uterus* in advanced pregnancy, terminating fatally, is described by Mr Henry Partridge of Birmingham.

This was the case of the mother of six children, who was seized with abdominal pain and vomiting of bilious matter in the beginning of the eighth month of pregnancy. The symptoms continued with much faintness and depression of strength, and with a pale and sunk countenance, as if from extreme hemorrhage, though she had lost but little blood. In about six hours from the commencement she was delivered of twins, each child being enveloped in its proper membranes with the *placenta* attached. The pain increased in intensity, notwithstanding the use of opium; there was rather more than usual discharge, and she died in about four hours after delivery.

About sixty ounces of thin dark-coloured blood without coagula were found in the *abdomen*; the *uterus* was well contracted, and without any unusual appearance on its anterior part, except some *ecchymosis* in the cellular texture round the Fallopian tubes and ovaries. On its posterior surface, however, a considerable number of transverse lacerations were discovered, all more or less curved in form, averaging from half an inch to two inches in length, and varying in depth. A flap of detached *peritoneum* had fallen down, leaving the raw and fibrous structure from which it had been torn completely exposed.

The immediate cause of death is referred by the author to exhaustion from internal hemorrhage and intense pain. He refers to similar cases as described by Sir Charles Clark, Dr John Ramsbotham, Mr Chatto, and Mr White.

The fourth article in the department of Medical Pathology consists of Observations on Fibro-Calcareous Tumours and Polypi of the *Uterus*, by Dr Robert Lee.

In former papers which have appeared in the Medico-Chirurgical Transactions, Dr Lee has treated of diseases produced by inflammation of one or more of the textures which enter into the composition of the *uterus*,* and the readers of this Journal have already been made acquainted in considerable detail with the views of the author on this subject in our thirty-fourth and thirty-eighth volumes.

In the present communication, the object of Dr Lee is to treat of the pathology of fibro-calcareous tumours and polypi, being the most important organic affections included in those diseases of the *uterus* where there is no tendency to degenerate into a malignant form, and which do not contaminate the surrounding structures.

The following is the author's description. "The fibrous tumour, or fleshy tubercle of the *uterus*, as it was termed by Dr William Hunter, is sometimes met with not larger than a pea, in other cases it grows as large as a walnut, and occasionally is equal in size to a cricket-ball, or even the gravid *uterus* in the ninth month. It is generally of a globular form, or kidney-shaped, and when cut into, presents a laminated or radiated semi-cartilaginous structure, the fibres being often disposed in a concentric manner. At other times, this tumour has a granular appearance, or seems to consist of a congeries of smaller tumours, each having a thin capsule of cellular membrane. Most frequently, it has a yellowish white colour, but several specimens of the disease have been of an ash-gray colour, or approaching to a dark slate. When large, the tumour is often unequal on its surface, being lobulated or divided by deep fissures, and arteries and veins of considerable magnitude can be traced into its substance. Cavities containing a bloody or dark-coloured gelatinous fluid are sometimes formed in the central part of the tumour, probably by a process of softening which its substance undergoes. In a specimen of large fibrous tumour imbedded in the walls of the uterus, which was removed from the body of a woman who died in the Saint Marylebone Infirmary, there is a considerable cavity which contains a coagulum of blood.

"In other cases, the tumour does not manifest a disposition to become softer as it enlarges, but its density gradually increases, until the whole or the greater part of the mass has become cartilaginous, or like intervertebral substance, without vessels containing red blood; or calcareous depositions are gradually formed in the substance of the tumour, until it is either partially or completely converted into a concretion composed of carbonate and phosphate of lime. Most frequently the calcareous depositions are first formed in the central and most dense parts of the tumours, but this is not invariably the case, and in a few rare instances the deposit has taken place around the circumference of the tumour, and has inclosed it, as the shell incloses the kernel of a nut. If injection be thrown into the vessels of the *uterus*, it does not penetrate the substance of the tumour when in this dense state. Fibro-calcareous tumours of the *uterus* are generally soft and porous, like pumice-stone; but instances have occurred in which they were so hard, that they admitted of being polished, like ivory or marble."—Pp. 95—97.

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* Medico-Chirurgical Transactions, Vol. xv. and xvi.

Dr Lee then enters into a most elaborate and comprehensive survey of all the different cases of fibrous and fibro-calcareous tumours recorded by authors to have been found in the substance of the womb, or to have been developed in any of its component tissues, with the view of ascertaining whether it be possible to distinguish those growths which have been so often confounded under the general denomination of uterine *polypi*. There is no doubt that this name has been commonly given to every species almost of new growth in the womb. Dr Lee arrives at the conclusion that it is possible to distinguish the bodies so named into four different varieties, none of which are malignant in their nature. These are, 1*st*, The fibrous tumour of the *uterus*; 2*d*, The follicular or glandular tumour, which is a hypertrophied state of the follicles or glands of the *os uteri*; 3*d*, The cystic or vesicular tumour of the womb; and 4*th*, The mucous tumour of the womb,—probably a hypertrophied state of the uterine mucous membrane. To these Dr Lee thinks may also be added that variety of tumour which consists of erectile tissue or of vascular cells and dilated arteries and veins.

These tumours it is important to distinguish with the view of employing measures of treatment. The observations of Dr Lee on this point are short and judicious.

> "With respect to the treatment of the various tumours which have now been described, I have few observations to offer. Iodine, mercury, and all other remedies have little effect either in arresting their growth or promoting their absorption. Women who have fibrous tumours formed in the walls of the *uterus*, should avoid mechanical pressure of the *hypogastrium*, violent bodily exertion, and every other cause which may excite inflammation or a determination of blood to the organs within the *pelvis*. Where congestion has taken place, it should be removed by local blood-letting, mild cathartics, and anodynes. Profuse uterine hemorrhage should be controlled by rest in the recumbent posture, cold applications to the *hypogastrium*, and the internal use of the acetate of lead.
>
> "When any of these tumours pass through the *os uteri* into the *vagina*, they may be removed by the ligature or by the knife. If the root is soft and slender, the tumour may easily be twisted off by the forceps. In the course of the last twenty years, Dupuytren states, that he has removed two hundred uterine *polypi* by excision. Hemorrhage has only occurred twice in all the cases, and in both instances it was permanently arrested by the tampon. In eight or ten cases, after the application of the ligature, death took place from the absorption of pus into the system."—Pp. 131, 132.

The remarks on Malformation of the Internal Ear, by Mr Edward Cock, are founded on the inspection of the state of these parts in five cases of congenital deafness.

The children whose ears were examined were inmates of the Deaf and Dumb Asylum; and all of them died of strumous discases of the thoracic and abdominal viscera. In three instances, there was scrofulous ulceration in both ears, with partial destruction of the *membrana tympani;* and in one, the cavity of the *tympanum*, the mastoid cells, and the whole cancellated structure of the petrous bone, were filled with the aqueous deposit of scrofula. The petrous portions of the temporal bone were in all the cases much varied in size and shape, having sometimes a deficiency, and sometimes an excess of osseous developement.

In two of the cases there was a partial deficiency of the semicircular canals; in a third, which occurred to the author subsequently to the communication of his paper, not a vestige was to be found of the *fenestra rotunda* on either side, the usual situation of the membrane being occupied by solid bone; and in a fourth, mentioned by a friend, the aqueduct of the vestibule was so large as to admit a small probe; while in ordinary circumstances, a fine hair can with difficulty be introduced into it. The importance of the semicircular canals to the perfection of the auditory organ is manifest from the circumstance, that the ears of all animals, except those of the lowest class, the *Crustacea*, in which an auditory apparatus is traced, have that particular part of structure.

The account of the *Examination of the organs of Hearing*, from the body of a boy aged 13 years, who had been the subject of congenital deafness, by Mr Thurnam, may be regarded as a supplement of the paper last noticed.

In one ear the horizontal semicircular canal was imperfect, and there was no trace of *sacculus* or *utriculus vestibuli*, or of membranous semicircular canals. In the other, there was a minute quantity of calcareous-like incrustation found in the vestibule, and extending into the opening of the *scala vestibuli*. No *sacculus* was met with; but there were very minute gelatiniform membranous semicircular canals found.

Dr Bright details the circumstances and necroscopic appearances of six cases illustrative of Diagnosis where Adhesions have taken place in the *Peritoneum*, and subjoins several interesting remarks upon some other morbid changes of that membrane.

In the course of the author's hospital practice, he has often had occasion to observe, that when adhesions have taken place between the *peritoneum* and any of the abdominal *viscera*, in consequence of inflammation, "a very peculiar sensation has been communicated to the touch, varying between the crepitation produced by *emphysema*, and the sensation derived from bending new leather in the hand." In each of these six cases Dr Bright had an opportunity of ascertaining, by examination after death, that adhesions existed in the parts where this crepitating sensation was recognized; and conversely, in no case did he observe the phenomenon, and find that the particular morbid appearance did not exist; and he consequently infers that adhesions of this kind must have existed where he recognized this crepitating sensation, but was unable to inspect the state of the parts after death. Of this nature he gives a seventh case, seen with Dr Farre and Mr Edenborough, in which, from the presence of the crepitating sensation, he inferred the existence of adhesions. No inspection was permitted. An eighth case, with confirmatory dissection, is given by Mr Copland Hutchinson.

The three last articles in the department of medical pathology may be arranged together. They consist of papers by Dr John Sims on *Serous effusion from the Membranes, and into the Ventricles of the Brain,* and its connection with Apoplexy, and other diseases of the Brain ; *On Hypertrophy and Atrophy of the Brain ; and on the Cure of Ramollissement of the Brain.* These three papers contain a very interesting series of facts and observations on some of the most important subjects of pathology. The following is the author's summary of his first paper, that on *serous effusion.*

"*1st,* That very copious effusion of serous fluid is found between the membranes and in the brain of persons of all ages, more especially between the ages of fifty and seventy years, who have died of various diseases of the *thorax* and *abdomen,* and who manifested no appreciable symptom of cerebral disease during life. That under similar circumstances, various other morbid appearances are found in the brain, as thickened membranes, diseased blood-vessels, tumours, &c. That these several morbid states of the brain did not occasion the death of such persons.

"*2dly,* That effusion of serous fluid into the ventricles and membranes, to a very considerable extent, exists in the brain of persons who have suffered previous apoplectic attacks, attended with paralysis and general or partial atrophy of the brain. That, most probably, this effusion and atrophy have existed for many years, without producing the disease termed serous apoplexy: that persons so circumstanced live to an advanced age, and are destroyed by other maladies.

"*3dly,* That in persons whose brain has long contained a large quantity of fluid, with or without any trace of previous apoplectic extravasation, and who have suffered a first attack or a subsequent attack of fatal apoplexy, it is probable that the brain, from this cause, is rendered less impatient of injury from extravasation of blood. This position is exemplified in a remarkable manner in Case VI., of extravasation into the ventricles, and in Case X., of extravasation on the surface of the brain.

"*4thly,* That a loaded state of the blood-vessels is sufficient to produce all the symptoms of sanguineous apoplexy, and to occasion death without extravasation. It is probable that when this state of the vessels is found connected with only a small quantity of fluid in the membranes or ventricles, that death has been occasioned by simple sanguineous apoplexy. That convulsions in children arise in general from cerebral congestion, and are essentially cases of sanguineous apoplexy.

"*5thly,* The conclusion is highly probable, that in very many instances of sudden or speedy death, which have been supposed to be occasioned by the presence of serous fluid discovered on dissection in the membranes or ventricles, death is not attributable to this fluid or to serous apoplexy; but the inference is much more reasonable, that these cases may be referred to simple sanguineous apoplexy, the fluid in the brain having nothing to do with the fatal event."—Pp. 312–314.

Hypertrophy of the brain, the author considers merely as enlargement of the brain, with or without a change of texture; and he gives a sketch of the opinions and descriptions of authors as to this affection. It often occurs as mere enlargement; and when there is a change of texture, which may be of various kinds, it seems generally connected with a state of brain, of a more acute character, and to have been produced "more or less rapidly, by any causes that excite the brain or its blood-vessels, or that increase general or partial nutrition." Simple sanguineous apoplexy may be very readily induced in such a state of brain by a very slight additional compression from a small extravasation of blood.

Disorganization of the heart and lungs may, the author thinks, so impede the return of blood from the head, as to produce hypertrophy of the brain; and he considers it probable, that some cases of sudden death, which have been attributed to a flaccid state or spasm of the heart, or to *angina pectoris,* might actually be owing to hypertrophy of the brain, causing simple sanguineous apoplexy, though unnoticed in dissection. It would appear, however, from some of the cases, that he considers hypertrophy itself as being sometimes a sufficient cause of death, without the sanguineous effusion just stated.

Hypertrophy of the brain, sometimes terminates in inflammation leading to ramollissement, and when *hydrocephalus* is suspected, hypertrophy only is occasionally found to exist. It may be either general or partial; but it is always confined to the *cerebrum,* and never affects the *cerebellum.* Where the brain is very large, but not to the extent which amounts to hypertrophy, and persons die of other affections than those of the head, especially *pneumonia,* and other diseases of the lungs and heart, the brain is generally found much loaded with blood. From an extensive series of observations made by the author, it appears that the average weight of the brain goes on increasing from one year old to twenty, the average rising from 2℔. 1 oz. to 2℔. 13 oz. Between twenty and thirty, there is a slight decrease in the average, which is 2 ℔. 12 oz. The average afterwards increases, and arrives at the maximum between forty and fifty, when it amounts to 2 ℔. 14 oz. But after fifty to old age, the brain gradually decreases in weight, the average at seventy and upwards being 2 ℔. 10 oz.

Atrophy of the brain, according to the author, may occur either generally or partially, and is most prevalent at advanced periods of life, and under the influence of *phthisis pulmonalis*, diseases of the stomach, and other emaciating distempers. It is not confined to the *cerebrum*, as is hypertrophy, but applies equally to the *cerebellum*; and the place previously occupied by cerebral substance is supplied by serous fluid, or a deposition of bone, which sometimes takes place in the inner surface of the *cranium*, sometimes in the diploe.

With regard to *ramollissement* of the brain, the author considers, that there are two species of it, one of a red colour, affecting generally the cineritious substance, and arising either from the capillary vessels which carry red blood, being dilated in the softened parts; or from extravasation or exudation; the other, of a white or pale yellow colour, and affecting the medullary portion where no red capillaries are seen. The occasional cure of *ramollissement*, he thinks is established by the dissections brought forward on this subject; and is of opinion that some of the appearances which are found in the brains of persons who have at former periods had apoplexy or palsy, are referable to such a circumstance.

The atrophy of the gray matter, "whether on the surface, or in the central parts of the brain, when a fawn-coloured deposit is connected with the wasted spots, and the numerous small holes in the white matter with yellow deposit," he is inclined to consider as evidence "of the arrest or cure of red *ramollissement*; and the clean cut cavities in the white matter, and sometimes in the gray matter attached to it, and very often in the gray matter of the *corpora striata*; the numerous small holes, lined by a pale membrane, vascular or not, and containing serous fluid; also the new bread, or porous cheese appearance, and the small harder lumps in the white matter, and the general hardening of it, as evidence of the arrest or cure of white *ramollissement*."

In the department of Surgical Pathology the volume contains five articles.

The first consists of Cases of Fracture of the Neck of the *Femur*, with the appearances observed after death; by Mr Howship.

The cases are nine in number, and are all of females advanced in life. They exhibit various examples of the mode in which the curative process is carried on after injury at the hip-joint, and will be perused with interest. But as the author speaks of offering, in a future communication, some remarks illustrative of ossific union, which have been suggested by the present cases, we think it would have been much better if the publication of this paper had been delayed till those remarks could have been annexed to it. The detail of cases, without comment or connecting medium, is hardly, we would submit, a legitimate object of the Society's operations.

The Second paper consists of cases of Warty Tumours in *Cicatrices*, by Mr Cæsar Hawkins.

The author is of opinion that the term *malignant* should be restricted to such diseases as have a contaminating influence on the surrounding parts, or on the absorbent glands, by the formation in them of a new structure; and as likewise have a tendency to reappear in distant and unconnected parts of the body. Cancer of the breast is of this description; but cancer of the *scrotum*, and the corroding ulcer of the *uterus*, are not so. It appears to the author, however, that some word is wanted for that form of disease of which he now treats, where a new structure is capable of being formed, such as affects the surrounding parts, and renders the removal of the whole of the affected portion necessary.

This peculiar disease, which he calls the *warty tumour of cicatrices*, makes its appearances in some old scar, from whatever description of injury it may have arisen. "There appears, in the first place, a little wart or warty tumour in the cicatrix, which is dry and covered with a thin cuticle, which soon becomes moist and partially ulcerated like the warts of mucous membranes, from which a thin and offensive and semi-purulent fluid is secreted. In this stage there is no pain nor inconvenience."

An example of this, the first and mildest stage of the disease, is given in the case of a soldier who had several times undergone the punishment of flogging in the East Indies.

The second stage has a more rapid growth, but soon loses the warty appearance, becomes more solid, and assumes the character of *fungus hœmatodes*, being very vascular, and bleeding when touched. Fresh warts are formed round the mass, which in their turn are subjected to a similar change. The tumour soon ulcerates and sloughs, with a great deal of pain and suffering; and warts are generated at the circumference, which in their turn ulcerate and slough; and thus the patient is worn out, but without having the sallowness of malignant disease, or any affection of the absorbent glands.

Examples are likewise given of the disease in the cicatrices of burns and scalds, and in those from wounds of various kinds. In all these cases, the affection seemed to originate in the skin, which soon lost every trace of its original texture, while the tumours themselves, when carefully examined, were found to consist "of fibres rising perpendicularly from the base of the tumour, where it is attached to the *fascia*."

The bone is in general not affected, or but little so, and the tumours, even when of considerable magnitude, may often be safely removed by excision, which is much preferable to the action of caustic. In the leg, however, the removal of the whole limb is generally necessary when the tumour is at all extensive.

In the third surgical paper, containing Observations on Ulceration of the Cartilages of Joints, and on Anchylosis, by Mr Herbert Mayo;—the principal object of the author is to show that articular cartilages are liable to three distinct forms of ulceration, which, though they may be occasionally combined, are oftener met with separately.

The first form is exemplified by cases of "rapid absorption of cartilage, beginning on its synovial aspect, the new surface, if cartilaginous, being smooth and unaltered in structure, if of bone, healthy; the absorption of cartilage being attended with inflammation of the capsular synovial membrane." The absorption takes place rapidly, and through the medium of the vessels of the cartilage itself. There is severe pain, with inflammation of the capsular synovial membrane, and generally suppuration in the adjacent cellular tissue; and the only favourable termination known to the author in such cases is anchylosis.

The second form of ulceration is of a chronic kind, and begins, like the first, on the synovial aspect of the cartilage, "producing an irregular excavated surface with fibrous or brush-like projections of the cartilage and synovial membrane, attended with inflammation of the capsular synovial membrane, and sometimes of the same membrane when it is reflected over the cartilage; the bone and the surface of the cartilage towards it being healthy."

The third form of the disease consists in "absorption of cartilage beginning on the surface towards the bone, attended with inflammation of the adjacent surface of the bone, with inflammation of the synovial membrane, and sometimes with sensible vascularity of the cartilage itself." It is much less manageable than where the cartilage is ulcerated on its synovial surface, and the circumstance most against recovery is the partial or complete separation of portions of cartilage from the bone, which proves a considerable source of irritation.

On the subject of anchylosis, the author mentions it as being of three kinds, *bony*, *cartilaginous*, and *mixed*; but there is much analogy between them, for in each there is an exudation of coagulable lymph, which glues the parts together, and afterwards becomes an organized medium of union.

In a case mentioned by the author of bony anchylosis of the ancle joints, the cartilage was found absorbed, and the end of the bone denuded and joined together with a layer of semitransparent and organised lymph. The surface of the bone to which the lymph adhered was extremely vascular for the depth of one or two lines. An example of cartilaginous anchylosis exhibited itself in an union of the *patella* to the fore and upper parts of the condyles. It gave way by some force, and then it was found that an union had taken place between two ulcerated surfaces of cartilage which were longitudinally but irregularly grooved.

Mixed anchylosis occurred in the union of a *patella* denuded of its cartilage to the cartilage of the corresponding part of the femur through the medium of a thin layer of lymph.

The fourth surgical paper contains *Further remarks on the Ulcerative process*, by Mr Aston Key,

In addition to the forms of ulcerative process described in his former paper, * Mr Key now mentions a fourth form of ulceration of articular cartilage, to which he applies the term of *disintegration* in contradistinction to *absorption*. In the formation of an abscess, the first step is a deposit of the solid or fibrinous part of the blood, either mixed with or free from red particles. The deposit remains for some time unchanged, but at length becomes softer in consistence, and assumes the character of purulent matter; and this not only applies to the fibrinous or tubercular deposits, but to the vascular and other organized tissues of the body, which are thus broken down, and mixed up with the purulent deposit. In time, however, the sides of the cyst became organized, and secrete purulent matter. Ulceration the author considers as a process analogous to this softening; he views it as a vital action, a sort of conversion of animal matters into their original elements. The removal of textures by absorption in their way to the surface he holds to be unnecessary; and considers that in many cases of animal poisons, as those of a syphilitic nature, the constitution would always be affected on the first appearance of ulceration were that the case. Ulceration of cartilage is effected in the same way as an ulcer is formed in soft parts. It commences in the structure of the cartilage itself, but it is rare as a primary disease; for nature endeavours, as long as she can, to remove the cartilage by absorption, in order to prevent the necessity of suppuration.

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* Medico-Chirurgical Transactions, Vol. xviii.

The fifth and last article in the department of surgical pathology consists of *Observations on Fractures of the Bones of the Pelvis*, by Mr Earle.

In all cases of this kind, the author considers the symptoms as more nearly resembling those arising from fracture of the neck of the *femur*, than from dislocation of that bone. He impresses strongly the importance of immediately examining the state of the *urethra* in all cases of fracture or injury of the *pelvis;*—as the only chance of safety is in securing an exit for the urine when the *urethra* is torn asunder.

In the department of Materia Medica and Therapeutics there are two papers.

In the first we find a relation of some cases of *Mental Derangement* successfully treated by the acetate of morphia, by Dr Edward J. Seymour.

Three cases are given, and others are alluded to, in which doses of a grain of morphia given at bed-time had an excellent effect in producing quiescence and rest.

This medicine seems to the author to be of more use, " in what is termed *melancholia*, where the mind is tortured by imaginary want, ruin, or crime, than where the derangement partakes of more brilliant ideas, as of superhuman knowledge, dexterity, or wisdom; or in those cases in which one single idea occupies and engrosses the mental powers."

In this mode of treating *mania*, and especially melancholy, there is nothing new. Opiates in different doses, sometimes very large, have been given by many physicians, from Van Swieten, Bernard Heute, and Cullen, to Esquirol, Schneider, and Kriebel. It is interesting, however, to observe, that Van Swieten records the case of a maniacal girl, who, after much unsuccessful treatment, at length recovered after swallowing by mistake a scruple of opium in vinegar. This circumstance led us to suggest, in our account of the work of M. Guislain in 1829, the employment of the acetate of morphia, the therapeutic effects of which we are happy now to see confirmed by the clinical experiments of Dr Seymour.

In the second paper on Materia Medica, Dr Elliotson treats of the *Medicinal Properties of Creosote*.

The readers of this Journal are well aware, (Med. and Surg. Journal, Vol. xlii. p. 230 and 478,) that Creosote is a principle discovered by M. Reichenbach in pyroligneous acid, and all the tars, and that it is so denominated from its property of preserving animal matter. It was first tried by Dr Elliotson in *phthisis* and epilepsy, as being two diseases which, as being among the " chief *opprobria medicorum*, may justify any new attempt at cure that is not dangerous or absurd." It proved unsuccessful in both; but as it seemed to possess some remarkably tranquillizing effects, he was encouraged to try it in *neuralgia*, *hysteria*, and the general morbid excitability which is sometimes denominated extreme nervousness.

In rheumatic *neuralgia*, not inflammatory, Creosote is most useful; and in *hysteria* and nervousness, and in palpitation depending upon mere morbid excitability of the heart, it has been very serviceable. It has a remarkable power in removing nausea, and in checking vomiting; and will thus, even in *enteritis* or colic, prepare the way for other remedies. In *diabetes* it is a promising remedy; and as an external application in indolent ulcers, it has been beneficial. Dr Elliotson has generally begun with doses of half a drop or a drop, and increased the quantity as it has been borne.

We cannot help, however, thinking, from the trials which we have personally made, that its therapeutic powers are very likely to be overrated. It possesses even in the healing of sores a faculty of cicatrizing their surface, without healing perfectly the subjacent parts. Its properties as a local agent seem in all instances much more efficient than as a constitutional remedy.

ART IV.—*A Treatise on Pulmonary Consumption, comprehending an Inquiry into the Causes, Nature, Prevention, and Treatment of Scrofulous Diseases in general.* By JAMES CLARK, M. D., F. R. S. E., &c.

IN the 43d volume of this Journal we gave an account of the present treatise in the first form in which it was presented to the public, as the Article on Consumption in the Cyclopedia of Practical Medicine. That article, though elaborate, comprehensive, and detailed as the importance, obscurity, and complexity of the subject under consideration demanded, was necessarily accommodated to the nature and limits of the work in which it was destined to appear. In the present treatise, though founded on the former essay, and in many respects coincident with it, the reader will find various important additions and improvements. These are so insensibly and gradually made, that we feel it difficult to specify them without falling into the error of repetition and frivolous minuteness. We propose at present to advert to a few of the most important topics treated by the author, on which our limits did not allow us formerly to bestow sufficient consideration.

The observations of Dr Clark on the morbid anatomy and pathology of consumptive disorders are very judicious, and merit especial attention. The author adopts the views given by Dr

Carswell, that tubercular matter is invariably deposited from the blood on the surface of the mucous and serous membranes; and that the free surface of the former order of membranes forms the chief, that is, we presume, the most frequent seat of tubercular deposits. The granular appearance which these deposits assume in the lungs, Dr Clark, in imitation of the same pathologist, considers to be owing to its accumulation in a small number of contiguous air-cells; and the lobular arrangement which it sometimes presents in the same organ the author represents to be produced by its being deposited in the air-cells of many lobules, the intervening pulmonic tissue being unaffected.

Tubercular matter in the lungs Dr Clark describes as assuming three distinct forms; the *first*, that of gray semitransparent granulations; the *second*, that of the caseous and crude tubercle; and the *third*, that of tubercular infiltration.

The *first* variety is the most ordinary form in which tubercular matter appears in the lungs as a cause of consumption. These are at first semitransparent, of cartilaginous hardness, and vary in size from a mustard seed to that of a pea. They correspond in this state with the gray or miliary granulations of Bayle, and were believed by Laennec, Louis, and some others, to be the early or incipient form of pulmonary tubercles. Dr Carswell, however, shows that they may continue in the gray semitransparent state and small size, without necessarily passing into the opaque state of tubercular matter, and that the latter may appear without being necessarily preceded by the former.

The crude tubercle, which is the *second* variety of the disease, consists of rounded bodies, varying in size from a pin's head to that of a small walnut, of a yellowish white colour, a soft cheesy consistence, and opaque instead of being transparent. They are very generally the result of changes which have taken place in the gray semitransparent granulations.

It seems, at first sight, difficult to understand how the gray granular tubercles, if really deposited on the mucous membrane of the pulmonary vesicles, can produce the large solid masses, and the cavernous destructions of the lung, which we find in the bodies of those who have become the prey of consumption; and there appears some difficulty in reconciling this view with the state of the lungs found in those who have died after consumptive symptoms. It is to be remembered, however, that the morbid anatomist in very few cases sees the early and incipient form of this disorganization; and it is only after the tubercular bodies have coalesced and become greatly changed, and destroyed the portion or portions of lung in which they are situate, that we have an opportunity of examining them and their effects. The small tubes and vesicles, in which the tubercles were first deposited, have then been destroyed and removed by the process of disruption among the tubercular masses; and consequently no trace of the original arrangement of the tubercles is left.

As to the peculiar connection of the excavations and the state of the bronchial tubes, Dr Clark thinks it is easily explained by the mechanical and physiological irritation which these bodies produce on the bronchial membrane. As that membrane is constantly distended and progressively stretched by the presence and increased growth of the tubercles, it is first inflamed, and then destroyed by ulcerative absorption. Hence the bronchial tubes are always found enlarged, abruptly interrupted or truncated, and appearing as if they had been cut across at their entrance into an excavation. "Unlike other parts of the lungs, they are never found enveloped and compressed by tubercles, except in those instances of rapid infiltration in which the whole substance of the lungs appears to be simultaneously injected."

The *third* form of pulmonary tubercle is considerably different from either of the two first, both in physical characters and the locality in which it is deposited. It consists of whitish soft masses deposited, not in the mucous membrane of the bronchial tubes, but in the submucous or filamentous *parenchyma* of the lungs. It is the same as that to which several French authors have applied the name of infiltration. From the observations, therefore, of the pathologists who have written on this variety of tubercular matter, it appears that it is the only one which takes place in the cellular or filamentous tissue of the lungs, or, in other words, does not occur at the free surface of the mucous membranes. In their subsequent course these tubercles produce nearly the same changes on the structure of the lungs as the other two varieties, though they sometimes give rise to more serious and distressing symptoms.

In the account of the further progress of these several forms of tubercular disease in the lungs, it gives us pleasure to observe that Dr Clark has done justice to the extraordinary merits, as a pathological observer, of Dr William Stark,—who certainly anticipated many of the observations of Laennec and Andral, and who has the merit of giving a much sounder and more accurate view of the pathology of pulmonary hemorrhage than either of these authors. The Clinical and Anatomical observations of that author, originally published in the first volume of the Medical Communications by Dr Carmichael Smith, and afterwards by the same author in his posthumous works,* contains an account of the various lesions observed in the lungs, both in those destroyed by acute and by chronic diseases of these organs, so faithful, accurate, and instructive, that we doubt whether, even in the writings of the subsequent observers, the descriptions, however full, are in all respects superior. The description of the state of the blood-vessels given by Dr Stark has been adopted by the present author.

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* The works of the late William Stark, M. D., consisting of Clinical and Anatomical Observations, &c. by James Carmichael Smyth, M. D. &c. London, 1788.

Dr Clark agrees with Laennec and Dr Carswell in admitting the sanability of pulmonary consumption by the exscreation of the tubercular matter, and the cicatrization of the cavity or cavities, or by the cretaceous conversion of the tubercular masses, and the contraction of the surrounding pulmonic tissue; and he places before the reader Dr Carswell's account of the process of healing, and the mode in which it is effected. To these changes, however, he does not attach much importance in a therapeutic point of view, farther than as they encourage us to correct the original disposition to tubercular disorganization.

On the subject of *the diseases which attend and complicate Consumption*, our limits will not allow us to enter. We may recommend, however, the chapter as one which gives a full, satisfactory, and instructive view of the subject.

On the important topic of the *Statistical History of Consumption*, the eighth chapter of the present treatise may be mentioned as giving the most complete view extant. It is well known that this part of the inquiry is one of the highest importance, since its results, if carefully and faithfully obtained, cannot fail to throw much light upon the etiology of the disease; and consequently must tend, though indirectly, yet very effectually, to aid the physician and medical police officer in discovering and applying the means of prevention. The subject has hence attracted much attention at all times; and many isolated facts have been recorded in illustrating it. But it is only of late years, that, by means of the concurrent researches of many inquirers, it can be said to have furnished results even approximating to precision. It is the great object of Dr Clark in the present chapter to give something like a general view of these results, deduced from all the most authentic sources.

From the researches of Papavoine on the mortality from tubercular diseases in the *Hôpital des Enfans Malades* at Paris, Dr Clark infers that tubercles prevail most during the third, fourth, fifth, and sixth years, when the annual growth does not exceed one-tenth of the child's weight. The per centage of tubercular deaths appears to be most considerable in the sixth, seventh, eighth, and thirteenth years; and the entire average mortality per cent. between birth and puberty is 55 per cent. It appears, however, that though more than a fourth or 27 per cent. of those who die between the period of birth and puberty are affected with tubercular disease, it causes death in not more than $\frac{1}{8}$ of the cases. From the third year upwards, these proportions are $\frac{2}{3}$ and $\frac{1}{3}$. Tubercles, in short, may be developed in many children, but do not prove fatal so readily at that period of life as at a subsequent period.

From a comparison of the lists of mortality in eight different places, it appears to be chiefly when the body is attaining its maximum of growth that the presence of tubercles begins to give rise to much serious disturbance in the system. The greatest number of deaths from this cause takes place between the ages of 20 and 30; the next in proportion between those of 30 and 40; the next between the ages of 40 and 50; while the succeeding rate of the list of mortality is placed sometimes between 15 and 20, at other times between 50 and 60, or even above 60 years. Dr Clark justly observes, that this remarkable accordance in the results obtained from the inspection of the lists of all the places, warrants the conclusion, that after the 15th year of age, fully one-half of the deaths from consumption occur between the 20th and 40th years, and that the mortality is about its maximum at 30, and after that age gradually diminishes.

It is curious to observe, that, with all their labour, research, observation, and calculation, the modern medico-statistical inquirers have not been able to improve on the conclusions formed on this point by Hippocrates, who, above 2400 years ago, from observations deduced from the inhabitants of the Cyclades, and the coasts of Asia Minor, fixed the most frequent age for consumption to be between the 18th and 35th year.

On the subject of the *Influence of certain occupations in inducing Consumption*, Dr Clark gives a very correct view of the researches of M. Benoiston de Chateauneuf, M. Lombard, the late Mr Thackrah, Dr Alison, and the other authors who have inquired into this subject. He adopts in general the results of M. Lombard, rectified, however, where requisite, by corrections from other sources. As the paper of M. Lombard is published at large in this Number, we beg to refer our readers to it, as containing the most complete view hitherto given on this subject.

An important point for the medico-police inquirer is to ascertain whether, upon the whole, consumptive diseases are on the increase or decrease in this country. Unfortunately, few documents are preserved to enable us to form any correct ideas on this point. Dr Clark, however, avails himself of such means as are accessible, viz. the Bills of Mortality of London, from the end of the seventeenth century to the year 1821. From this table it appears, that, during the first half of the eighteenth century, from 1700 to 1750, the deaths from consumption increased from 4 to 6 per 1000, and that since the latter period they have remained stationary. It was believed by some authors that consumption had increased since 1750; but this is a mistake arising from taking its *relative* mortality, as compared with that of all diseases, instead of its *absolute* mortality, in reference to the whole population. It now appears to produce *one*-third of the whole mortality; an increase which depends not on the increase of consumption, but on the diminished mortality from other diseases. The causes which have diminished the mortality of all disorders has had no influence on consumption, which continues as insanable as during the seventeenth century.

The subject of *Causes* or Etiology is examined at great length, and with much ability. But our limits will not allow us to enter on their consideration; and we must proceed rapidly to the therapeutic department of the treatise.

The prominent and peculiar excellence of the work of Dr Clark is, that the author gives not only very full and correct views of the morbid anatomy and pathology of the different forms of consumptive diseases, but that he takes most comprehensive and philosophical views of their etiology, with the purpose more of prophylactic than of curative management. No one who thoroughly understands the nature and tendency, and the usual effects of tubercular deposition in the lungs, and who has studied the constitutional origin of that formidable disorganization, can fail to perceive, that the great reason of the inefficacy of medical measures is because these measures are in the greatest majority of cases made to operate on effects only. Without entirely neglecting these effects, Dr Clark takes a deeper and more rational view of the subject, and directs the attention of his brethren to the primary causes of the tubercular disposition, the circumstances that tend to develope that disposition, and to favour its growth, and the circumstances that are found to prevent its appearance and counteract its progress; and by a very deliberate and attentive estimate of the respective influences of each, demonstrates the necessity of adopting a series of measures calculated to operate in preventing the developement of the disease, or, at all events, arresting its progress in the bud, rather than attemptimg to cure its effects.

It is in this manner that Dr Clark, (Chapter xii. Section ii. p. 273,) impresses the necessity of directing attention not only to the management of the health in early infancy, but to the mode of living observed by the parents, and even to the circumstances under which matrimonial unions are formed, and the absolute necessity of the parties looking to the state of their health and strength, if it be the wish of either parent to save themselves incessant anxiety and endless distress in the management of the health of their family. This subject is one of so great importance in the prophylactic management of consumptive distempers, and enters so directly and intimately into the formation and application of every measure, prophylactic and therapeutic, that we conceive it may serve the cause materially to place before our readers the sentiments of Dr Clark in his own language.

"In order, therefore, effectually to prevent the extension of tuberculous disease, we must in the first place direct our attention to the state of the parents. Were parents in general convinced that the health of their children depended chiefly upon the integrity of their own health, a beneficial effect might be produced upon society at large, and especially on the members of strumous families. If a more healthy and natural mode of living were adopted by persons in that rank of life which gives them the power of choice, and if more consideration were bestowed in matrimonial alliances, the disease which is so often entailed on their offspring might not only be prevented, but even the predisposition to it extinguished in their families in the course of a few generations. In the present state of society it is needless to observe, that the very reverse of this very commonly happens; and from the total disregard of the circumstances alluded to, the race often terminates in the third generation. The children of dyspeptic parents generally become the subjects of dyspepsia in a greater degree, and at an earlier age than their parents; and if they marry into families of a strumous constitution, their offspring are frequently found to be scrofulous, and to die of consumption, or some other tuberculous diseases in early youth and even in infancy. I could adduce melancholy examples of the truth of this observation; but it is at least consolatory to know, that the evil may be obviated; and it is a duty which parents owe to their offspring to endeavour to correct it."

"Members of families already predisposed to tuberculous disease should at least endeavour to avoid matrimonial alliances with others in the same condition; but, above all, they should avoid the too common practice of intermarrying among their own immediate relatives,—a practice at once a fertile source of scrofula, a sure mode of deteriorating the intellectual and physical powers, and eventually the means of extinguishing a degenerated race. It would also be well if persons contemplating marriage were aware of the necessity of attending to their health, previously to and after the adoption of this change of life. The dyspeptic should have recourse to such means as would restore the functions of his digestive organs, and should adopt and adhere to a regimen calculated to prevent the recurrence of his complaint; the gouty subject should renounce the well known causes of his disorder; but those who are afflicted with organic disease, more especially with consumption, should pause before they enter on a contract which can only entail disease or unhappiness on all concerned."

"The full extent of misery arising from injudicious marriages of this description is comprehended by the medical practitioner only; he will, therefore, appreciate the justness of these remarks, although he will acknowledge the difficulty of enforcing the necessary restrictions on the practical consideration of the public. I am well aware that mankind in general are far too reckless to attend to any precautionary measures on this subject, even although perfectly satisfied of their expediency; still there is a small proportion in that rank of life to which the above remarks apply with the greatest force, on whom these cautions may not be wholly thrown away."—P. 269, 271.

It is indeed impossible for the physiological physician to question the soundness of these observations, and the necessity of attention to the precautions which they suggest, if it be seriously wished to arrest the progress of strumous disease in general, and consumptive disorders particularly, in all the multiplied ramifications of society. But the great question comes always to be considered, to what extent these precautions are expedient and practicable in the present constitution of society? Unfortunately the subject is one, the importance of which is only equalled by its extreme delicacy. While physiological laws and pathological conclusions inculcate one lesson,—prudential considerations, the way of the world, the constitution and habitudes of civil society, the artificial, if not unnatural, modes of living necessarily imposed on all who live within its pale, the interests of families or individuals, in some instances fancy and passion, in other instances avarice disguised under the garb of prudence, and in others the more pardonable anxiety to avoid wounding the feelings of families and individuals,—all concur to speak a language quite the opposite. If the truth were to be investigated with an impartial eye, physiology and pathology would prohibit a very large proportion of the matrimonial unions which are daily effected among the middling and higher ranks. Of how few families can it be said, that no one of their members, either in the direct or collateral line, has at any time been cut off by consumptive disease; of how much fewer can it be said, that no one of their members has ever presented traces of strumous disease. All members, therefore, of families so characterized and designated must be regarded as included within the line of proscription. If, however, the necessity of enforcing this proscription be admitted, by what means is it to be carried into effect, and how is the painful truth to be communicated to the parties concerned?

Convinced, as we are, of the justice and soundness of the views given by Dr Clark on this important subject, we perceive obstacles almost insuperable to their being carried into effect; and we fear that, until a radical change is introduced in the habits of civilized life, and until something like a Spartan simplicity and severity of manners becomes general, the causes of consumption must continue to operate insensibly but extensively, and with an insidious multiplicity, and the disease must continue its ravages uncontrolled and unopposed. To the philosophical eye, indeed, it appears as if this multiplication of tubercular disease were the natural penalty of many of those deviations from the simplicity and regularity of a life undisturbed by passion or its effect, and the too exclusive pursuit of many of those objects, the possession of which may gratify an idle ambition, but can confer no lasting happiness.

To any one who can consider this subject dispassionately, and unmoved by those feelings to which it is liable to give birth, it must appear highly singular and inconsistent to observe mankind more solicitous by a great deal in preserving and improving the physical qualities of brute animals than they are in improving those of their own species. To view the matter in this light may excite a smile, or may seem absurd, or may be deemed coarse and indelicate. But it is a physiological truth, that if we wish to diminish the prevalence of consumption, so far as that distemper is dependent on hereditary causes, it is indispensably necessary to regulate the unions of the human species with the same prospective care and caution, for the health and vigour of the contingent offspring, as are observed in the care of animals generally. Were such precautions practicable, we might not despair of seeing the benevolent views of Dr Clark realized. But there is in this mode of considering the subject something so revolting to the delicacy, perhaps false, of the human breast, something so humiliating to its pride, and even something not entirely free from the shafts of ridicule, that until the mind can divest itself of all those manifold prejudices which twine round it from birth to old age, we can scarcely imagine the probability of such means being ever entertained.

In this as in every other struggle between truth and error, much benefit may be confidently anticipated to accrue from the wider extension and more multiplied distribution of rational information and intelligence. Something also may be expected from the judicious efforts, and well directed influence of intelligent medical practitioners, who have it often in their power to suggest, if not to advise in matters requiring delicacy and judgment, as well as knowledge and experience. It is, indeed, principally in this manner, perhaps, that the minds of individuals and families can be brought to view this subject in such a general and extended light, as to produce beneficial practical effects. We would recommend particularly the perusal of the observations of Dr Clark on this topic, as calculated to convey in a delicate but impressive manner, the knowledge of the important principles which are here to regulate the conduct.

The prophylactic directions regarding the prevention of the disease in infancy, childhood, and youth, delivered by the author in his next section, are not liable to any degree of doubt or difficulty of the kind now mentioned; and they have the advantage of being not only practicable but indispensably necessary, and ought to be carried into effect in every case. Nothing, indeed, is so important for the future health, both of body and mind, and the comfort and welfare of the individual, as attention to physical education in early life; and it is impossible to doubt, not only that many a constitution originally good is impaired by neglect of the rules of this important duty, but that many of the diseases which embitter and abridge the duration of human life derive their existence from the same source.

Dr Clark takes a minute and skilful view of the powerful influence of the various external agents upon the functions of the infant, child, and adolescent; and animadverts with great judgment upon many errors which have crept into society in this department, from ignorance, prejudice, or the irresistible influence of habit and fashion. His observations on air and residence are particularly deserving the attention of those parents who have either lost children by strumous and tubercular diseases, or whose offspring are so delicate in health as to become the source of constant apprehension.

His observations on education and schools, on the allotment of time for the acquisition of knowledge, and on the necessity of cultivating and strengthening the corporeal powers as well as the mental faculties, merit the special attention of parents, guardians, and teachers. Little doubt can be entertained that the foundation of a life of bad health is often laid in schools and similar situations, in which young persons are kept for hours in a state of corporeal inaction,—without adverting to the pernicious consequences upon the health by chilling the extremities, accumulating the blood towards the internal organs, and suspending the different natural secretions. The necessity of regular and even very considerable exercise, to the maintenance of the vigour and energy of the corporeal organs, is at no period of life so obvious as during childhood and youth; and where this imperious law of attending to physical education is disregarded or violated, the penalty is in all cases most certainly exacted in the shape of bad health or early death.

On all these points the work of Dr Clark may be confidently recommended for explaining clearly, and impressing judiciously, the prophylactic principles, which may be expected to be effectual in preventing the formation of this inauspicious disposition to tubercular disease.

On the subject of the proper medical measures, we on a former occasion dwelt at sufficient extent to render it superfluous now to resume the subject. But we beg to recommend our professional readers to study this part of the work with care.

In conclusion, we have only to say, that the work of Dr Clark may, in the present shape, be regarded as the most complete and instructive Treatise on Consumption in the English language, and as one which, if carefully perused, and faithfully and judiciously applied to practice, cannot fail to be productive of much benefit.

ART. V.—*Physiologie des Menschen. Von Friedric Tiedemann, Lehrer der Anatomie und Physiologie an der Universität zu Heidelberg. Erster Band. Allgemeine u. s. w. Darmstadt.* 8vo. 1826. *The Physiology of Man.* By FREDERIC TIEDEMANN, Lecturer on Anatomy and Physiology in the University of Heidelberg. Vol. I. *General Considerations on Organic Bodies.* Darmstadt, 1830.

A Systematic Treatise on Comparative Physiology, introductory to the Physiology of Man, translated, with Notes, from the German of Frederic Tiedemann, Professor of Anatomy, &c. By JAMES MANBY GULLY, M.D., and J. HUNTER LANE, M.D., F.L.S., &c. Vol. I. London, 1834. 8vo. Pp. 431.

IN the compilation and arrangement of a systematic work on Physiology, Haller has left all subsequent authors at an immeasurable distance; and the extensive information, the laborious research, the unrivalled accuracy, and the general soundness of judgment and reasoning displayed in the *Elementa*, appear to have made every subsequent inquirer sit down in despair at ever being able to produce any performance with even a remote and imperfect resemblance to it.

It thus appears that all the ablest physiological teachers on the continent were contented for a long series of years with giving short and compendious views of the science, deduced chiefly from the materials collected by Haller, with such additions and modifications as observation and experiment suggested. In this manner Blumenbach, Hildenbrandt, Prochaska, Kreysig, and Autenrieth, published elementary works of various extent and merit, chiefly with the view of giving their pupils and physiological students generally, such compendious views as the season of education permitted; and many subsequent authors in the same country attempted in the same manner to present views of the science on the same scale. It is remarkable that of all these treatises, those only of Blumenbach and Prochaska have maintained any distinguished rank in the history of physiology.

The first person who appears to have had the courage to form the conception of a work on the same extended plan with that of Haller was Gottfried Reinhold Treviranus, who in 1803 published at Bremen the first volume of his Biologie, or the Philosophy of Living Nature for Physiologists and Physicians, —a work in which, he informs us, he studied to follow the example of the indefatigable anatomist of Berne, in collecting, rectifying, and arranging facts, and in presenting a generalized view of those which could be said to constitute a body of physiological knowledge. The conception was great and magnificent, and was calculated, when carried into effect by a person so learned and so well acquainted with the structure and functions of organized beings, to supply the wants of physiological students, and to connect the work of Haller with the beginning of the nineteenth century. The magnitude, however, of the design was a great impediment to its completion. Though the second and third volumes were published in the course of two years after the appearance of the first, nine years elapsed between the publication of the third and fourth volumes; the fifth appeared only in 1818; and the sixth was published in 1822.[*]

The great objection to this work is one which is applicable not to it individually, but to works, the parts of which are published at intervals so remote. The materials of the volumes first published are not of so recent date as those of the latter volumes, and consequently the work presents a want of uniformity and equality in point of information, which impairs in a great degree its utility as a guide to the student.

Of this evil it is evident that the learned author himself was perfectly aware. For in the preface of a similar work presently to be mentioned, he allows in 1831 that he had written the first volume of the Biology thirty-five years before; and that in the attempt to revise and accommodate the early to the latter part of the work, he found the difficulties so numerous and so insuperable that he resolved to write a new treatise. The result of this resolution was the composition of his Phenomena and Laws of Organic Life, (Erscheinungen und Gesetze des Organischen Leben,) which appeared in two volumes at Bremen in 1831, 1832, and 1833,—[†] a work certainly much less extensive and voluminous, but giving in a short and concentrated shape, a clear general view of the state of knowledge on the laws by which the functions of living bodies are regulated. Of the nature and contents of this treatise we may at some future period give a more particular account. At present we mention it for the purpose of saying, that it presents a most perspicuous and instructive view of physiological science, written in simple, accurate, and even elegant language.

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[*] Biologie oder Philosophie der Lebenden Natur fur Naturforscher und Aertze, Von Gottfried Reinhold Treviranus. 1803—1822. Band vi.

[†] Die Erscheinungen und Gesetze des Organischen Lebens, Neu Darsgestellt, von Gottfried Reinhold Treviranus, Erster Band, Bremen, 1831. Zweiter Band, 1832. Zweiter Band Zweite abtheilung, 1833.

Meanwhile Rudolphi, Professor of Physiology at Berlin, had recognized the necessity of a general treatise on the functions of living beings; and accordingly prepared elements of the science, which appeared at Berlin in two volumes octavo, the first in 1821, the second volume in two parts, the first of which was published in 1823, and the second in 1828. This treatise is in many respects extremely excellent. The method of the author is to state his general principles in the form of propositions or aphoristical enunciations as a text; and to append to this the proofs and illustrations in the shape of notes in a smaller type.

Of this work an English translation was commenced and partly published in 1825, by Dr William Dunbar Howe. The first volume is all we have seen; and we know not whether Dr Howe has proceeded with his undertaking. From the specimen already published the meaning of the author appears in general correctly given; but we think there is frequently a degree of stiffness in the language, as if the peculiar idioms of the original had not been completely anglicised.

The work of Rudolphi is comparatively limited, and consequently less full on many points than the latter volumes of the work of Treviranus. The Treatises of M. Adelon and Dr Bostock were intended to be of a more comprehensive character, and to give more complete views of the facts and arguments illustrating the nature and objects of the several functions.

The former treatise has not realized the expectations to which its announcement gave birth. It abounds too much in vague general statements, is utterly deficient in the literary history of the science, and presents often mere speculative contradictions instead of well established facts.

Of the treatise of Dr Bostock we have spoken already on former occasions. It must be regarded as still an unfinished work.

A treatise still more comprehensive than either of those now mentioned, and attempting to make a nearer approach to the *Elementa* of Haller, began to be published in 1826 at Turin, by Lorenzo Martini, the Professor of Physiology at Pavia, and was completed in 1830, in twelve volumes octavo, under the title of Lectures on Physiology.*

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* Lezioni di Physiologia, de L. Martini. 12 volumes. Torino, 1826-1830.

The work of Martini is very learned, full, and extensive; contains all the essential information in the way of facts and arguments which such a treatise ought to possess; and the author occasionally illustrates or confirms his doctrines by new facts and singular cases. There is, nevertheless, a want of critical selection and condensation; every subject receives consideration equally elaborate; the style is rather diffuse and rhetorical, with occasional fits of poetical meditation; and the whole work is too lengthened and tedious. If the learned and laborious author were obliged to condense it into one-half the size, it would certainly contribute much to improve it, and render it infinitely more useful. Let us not, however, be either unjust or ungrateful to the Italian professor. With all its defects, the Lectures of Martini are a lasting monument of the erudition, knowledge, and industry of the author.

We come now to one of the most recent works on this important subject, the treatise of Professor Tiedemann of Heidelberg. Of this work the first volume only, which appeared at Darmstadt in 1830, has yet been published; and it is not easy from that to tell to what magnitude the work may be extended.

The present volume may be regarded as a sort of general introduction to the whole work. The author begins with a preliminary discourse on the objects and nature of physiology generally, considers the method of inquiry, the nature and utility of experiments, the advantage and influence of the collateral physical sciences, the importance and necessity of an extensive and accurate knowledge of zootomy or animal anatomy, and, lastly, the importance of physiology to the physician. This is followed by a learned view of all the authors who have cultivated the subject generally, or in departments.

Professor Tiedemann then commences the proper business of the work by a comparative view of the properties of living and lifeless bodies, and explains at considerable length the peculiar differences in the course of the first Book.

The second Book, which occupies the rest of the volume, is devoted to the comparison of the structure and functions of animals with those of plants.

After an account of the differences in chemical composition, external configuration, and intimate structure or anatomical constitution of plants and animals respectively, in the first section of this book, Professor Tiedemann proceeds to treat in the second section of the different functions as living processes in the following order.

Dividing the section according to the subject into three Parts or Divisions, he devotes the *first* part to the consideration of the general Functions of Nutrition as a vital process; the *second* to that of the Evolution of the imponderable substances in the exercise of the vital actions; and the *third* to that of the different Vital Movements exhibited by plants and animals.

Under the first head, or that of the Nutritious Functions, he considers, *first*, the materials of nutrition in plants and animals, or food; *secondly*, the introduction of these materials by absorption as in plants, or by oral prehension, as in animals; and, *thirdly*, the assimilation of these nutritious materials.

He then proceeds to consider respiration as a process of living bodies, *first* in plants, and *secondly* in animals; and after a minute and philosophical account of the phenomena and effects of this process in the two great divisions of the organized world, he concludes with a short section on the peculiar characteristics and object of that function. This is, he informs the reader, to prepare, by means of the influence of external physical agents, the Nutritive and Formative or Modelling Fluid, from which all the parts of the organism may be supported so long as they enjoy vital qualities.

This exposition qualifies the reader to understand the next stage in the process of life, that, namely, of the Motion of the Nutritive Fluids, to which Professor Tiedemann proceeds in the sixth chapter of this book. Here the author rather reverses the order previously observed, and considers the motion of these fluids *first* in animals, in their circulation,—and *secondly*, in plants, in the motion of the sap; and concludes, as in the last case, with a summary view of this function considered as a living process. These motions he regards as the effect of a peculiar organic power or energy, to which he proposes with Wolff and Kielmeyer to apply the denomination of Propulsive Force (Propulsions Kraft.)

Next comes under review Nutrition properly so denominated, the object of all the previous actions. This is treated in the seventh chapter under two heads as formerly;—the Nutrition of Plants, and the Nutrition of Animals; and the author winds up the whole with a pretty full view of the function considered as a general living process common to both kingdoms.

This first Division or Part is then concluded with a learned and instructive chapter on the secretions and the secreted products of plants and animals.

In the Second Part or Division, devoted to the Evolution of the Imponderables, Professor Tiedemann gives in three chapters a very learned and ingenious account of the Evolution of Heat in Plants and Animals, the Evolution of Light by Organic Bodies, and the Electrical phenomena exhibited by living bodies. The facts collected in this department are numerous and important; and altogether we know of no account of the subject so complete as that by Professor Tiedemann is.

The Third and last Part of the present volume is devoted to the consideration of the actions or movements of living bodies.

The author again slightly changes the order of his proceeding in this part; and treats first of the Motions of Animals, and then of those exhibited by Plants. These two chapters also exhibit a very comprehensive and learned view of this subject; and there is no kind, or variety of action or motion exhibited by any of the textures of animals or plants, of which the author has not given some account.

After describing the phenomena of these motions, like a faithful observer, the author proceeds like a philosopher, to consider the causes by which they have been either believed or proved to be produced; and here the reader will find a very clear and instructive account of the different hypotheses and theories which have at various periods been proposed in order to explain the motions observed in plants and animals. Professor Tiedemann considers thus separately Irritability, the proofs of its existence, and the laws by which it is regulated; Formative or Nutritive Energy as the efficient cause of the movements of formation, nutrition, and secretion; the Motive Energy of globules in fluids and seeds; and lastly, Organic Contractility, as displayed by the motions of muscles, those of simple animals of the lowest construction, those of plants, the motions of the animal cellular tissue, and lastly, in the contractile motions of the vegetable cellular tissue and the sap vessels.

We have given this rapid sketch of the contents of this work, and the method observed by the author, partly in order to show what a good and able treatise on physiology ought to be, and partly to raise, if possible, the standard of professional taste in works on this subject. We trust that Professor Tiedemann will proceed with his undertaking, and finish it in the same style and on the same scale in which he has commenced. It forms a beautiful and striking contrast to the crude and meagre, and confused compilations which are occasionally presented to the public in this country. With a rare combination of modesty and genius, accurate learning, indefatigable industry, and much originality, the present author has studied to become intimately acquainted with all the well-authenticated facts ascertained by his predecessors and contemporaries; he has then studied to arrange them in methodical order, and given them precision and accuracy; and from these he has deduced, with the dispassionate deliberation of an impartial inquirer, the conclusions which truly constitute accurate knowledge. The advantage of such a work is, that the pupil sees at once the authority for all the statements of his instructor, and is taught, while he is becoming acquainted with correct facts, the mode of using his own faculties and the practice of thinking and reasoning for himself,—an exercise not less valuable than the acquisition of useful knowledge.

The translation is well performed, and reflects credit on Drs Gully and Lane. Some of their expressions and words we would not have adopted. Irritability, we conceive, is as good a term as excitability, and expresses better the original Reizbarkheit of Tiedemann. The translators have not given the introductory discourse, for what reason we cannot perceive; especially as it contains a copious and well-arranged list of writers on physiology, which to the studious reader might have been highly useful.

Art. VI.—1. *Traité Theorique et Pratique des Maladies de de la Peau. Avec un Atlas in 4to, contenant 400 Figures gravées et coloriées.* Par P. Rayer, Medecin Consultant du Roi, &c. 2de edition, entierement refondue. Trois Tomes. A Paris, 1835. 8vo.

2. *A Theoretical and Practical Treatise on the Diseases of the Skin.* By P. Rayer M. D., &c. Physician to the Hospital de la Charité. The Second Edition, entirely remodelled, with an Atlas in Royal 4to in 26 copperplates, containing 400 Coloured Engravings.

In the twenty-ninth volume of this Journal we gave an account of the method and contents of the Treatise of M. Rayer as it first appeared in the year 1826, when the first volume only was before the public. The undertaking was completed in the second volume, which appeared in the course of the succeeding year. It then appeared to us that the great merit of the method of M. Rayer consisted in adopting that of Willan and Bateman, as the basis of his classification, while by his general extension of the system, and by the completion of some parts, and the rectification of others, he certainly, on the whole, gave it a more philosophical appearance. To this opinion we still adhere, and we think that one reason of the greater popularity of the methods of M. Rayer and of MM. Cazenave and Schedel, than those of some other foreign authors on cutaneous nosology, is the circumstance of adopting, as the general basis of their plan, the methodical arrangement, and the precise distinctions of the English author. At all events, the utility of the work of M. Rayer was speedily recognized by the circumstance of an Italian translation, by J. Fantonetti, which appeared at Milan in 1830, and an English translation by Mr Dickenson, published at London in 1833, and of which we gave a short account at the time of its appearance. [Medical and Surgical Journal, Vol. xl. p. 426.]

Since the period to which we now refer M. Rayer has been assiduously occupied in enlarging and improving his work, and rendering it more complete and instructive as a didactic treatise on the pathology and treatment of diseases of the skin. The present edition, though founded on the first, has been entirely remodelled, and may be regarded, with the single exception of the method of arrangement and classification, as a work altogether new. This circumstance would render it proper, if not necessary, to consider the whole work, did our limits permit. Such an undertaking, however, would lead us into an inquiry much too extensive and detailed for the present occasion. Nor is it necessary to do so, considering the nature of the treatise, which, however excellent, would oblige us, in such an account, to incur many repetitions, and bring under consideration many topics, which our readers will study with greater interest, and more profitably in the work of the author himself. All that we think it requisite at present to do, is to explain shortly the nature of the work, to glance at its principal contents, and to specify its merits as a guide to the medical practitioner.

Presuming that our readers can easily refer to our former article on the first edition of the work of M. Rayer, we have now to say, that while, in the first volume of the present edition, the author begins his undertaking with a view of the labours of physicians in the department of cutaneous nosology, he gives a learned, accurate, and just view of the contributions of each author, from Hippocrates to the present time, when this subject has engrossed the attention and exerted the ingenuity of Alibert and Biett in France, and Mr Plumbe and Dr Green in this country. In this historical sketch, no author, however unimportant, who has studied by any means to illustrate the nature and causes of cutaneous diseases, and improve their treatment, is omitted; and M. Rayer has evidently been at great pains to place before his readers a correct view of the entire literary history of cutaneous disorders.

M. Rayer then enters on the subject of his work by a preliminary chapter on Inflammatory Diseases of the Skin in general, in which he takes a full view of the causes and nature of these diseases, and best mode of treating them, with a general account of the different remedies used for that purpose. He then proceeds to the special business of his work, by treating of the individual inflammations of the skin, and examines successively the nosographical history, pathology, and treatment of the first four subsections; viz. the EXANTHEMATA, the BULLÆ, the VESICULAE, and the PUSTULAE. The individual diseases of these subsections being numerous and important, their consideration occupies the remaining part of the first volume.

M. Rayer next proceeds, in the second volume, to consider, in the same manner, the FURUNCULI or boils, including Boil, Stye, and Carbuncle or *Anthrax;* the Gangrenous inflammation of the skin, consisting of malignant pustule or Persian fire; the PAPULÆ according with the PAPULÆ of Willan; the SQUAMÆ, adding to those of Willan the *Pellagra* of Lombardy; and lastly, the tubercular inflammations of the skin embracing *Lupus*, Greek *Elephantiasis* or tubercular leprosy, and cutaneous cancer. The nosological history, pathology, and treatment of these diseases occupy the larger proportion of the second volume.

M. Rayer then proceeds to the consideration of the second section of his first chapter, or that on those Cutaneous Distempers which consist either successively or simultaneously of several different elementary forms of disease. Here he enters, first on the subject of *Syphilis* and syphilitic eruptions of the skin, and gives a most elaborate view of the various forms in which the effects of the venereal *virus* may appear on the surface of the body, illustrating the doctrines which he inculcates by several apposite cases. This is succeeded by a short subsection on the inflammation produced in the skin by the application of excessive heat, or burning, and a few observations on the effects of extreme cold, or frost-bite.

The third and last volume M. Rayer begins with the history of those affections of the skin, in which its vascular system and secretions are particularly deranged, and under this head introduces *Anaemia* of the skin, the varieties of *Purpura*, *Ephidrosis* or profuse sweating; and exfoliations of the *epidermis.*

This is succeeded by *Neurosis* of the skin; consisting of *Anaisthesia ;* discolorations of the skin, embracing the colourless or albino skin *(Leucopathia,)* blackening of the skin *(Nigritia,)* sun spots *(Ephelis,)* freckles *(Lentigo,)* variegated skin *(Chloasma,)* the black dandriff, which he denominates *melasma*, *Nævi*, blue discoloration, yellow spots, and lastly, artificial colorations, or those which are the result of means employed intentionally or accidentally.

Next follows the hypertrophy or anormal augmentation of the cutaneous tisues; and here we find first, hypertrophy of the *papillae;* hypertrophy of the *epidermis* embracing *ichthyosis* or the fish skin disorder, warts, the warty mole, horns and horny excrescences, corns, and callosities; hypertrophy of the vascular system of the skin, consisting of the vascular *naevus*, or aneurism by *anastomosis*, the Keloid tumour of M. Alibert, hypertrophy of the corion, and hypertrophy of the subcutaneous adipose membrane.

In the details of these two divisions, it must be observed that the author does not adhere to the order originally sketched in the tabular view at the commencement of the volume; and while in that table he makes very marked divisions and subdivisions of the different morbid states, he disregards these entirely in the subsequent description, and changes materially the order of their succession.

Next to the varieties of hypertrophy of the cutaneous tissues, M. Rayer places those of Degeneration; and under this head we find arranged fibrous tumours of the skin, *melanosis* of the skin, and tubercular matter in the skin.

The last subject in the series of the cutaneous tissues is that of the sebaceous follicles and their diseases. To this head M. Rayer refers the excessive secretion and viscid state of the sebaceous matter, under the name of sebaceous flux,—the same disorder which by others forms a variety of *acne*, the *Acne punctata*; the blackened secretions of the latter named *Tannes* or worms; the *Molluscum contagiosum* of Bateman, and Follicular Tumours, and Wens generally. After this elaborate and minute review of the diseases proper to the constituent tissues of the skin, M. Rayer proceeds to the consideration of the diseases liable to attack the appendages of the skin; viz. the diseases of the hairs, and their follicles or sacs, including supernumerary hairs, accidental hairs, baldness and *alopecia*; the diseases of the nails, comprehending *onyxis*, in its ordinary and venereal forms, *ecchymoses* of the nails, and malformation of the nails.

He then considers the nature and causes of gangrene of the skin, and *cicatrices* or scars; and concludes the subject by drawing a parallel between the diseases of the skin and those of the mucous membrane.

The latter part of this volume, to the extent of 130 pages, is then occupied with an appendix containing notes, extracts, and abstracts from many different sources on a great variety of cutaneous disorders, real or imaginary, historical or traditional, which could not conveniently be introduced into the text. These subjects are *pediculi* and other parasitical animals, with a learned dissertation on the *morbus pedicularis* of antiquity; Guinea worm or *Dracunculus*; the Arabian leprosy and Barbadoes leg; the Halebeen pustule, the Radesyge or Holstein Spedalsked, the Cossack or Crim-Tartary eruption, (die Krimmische Krankheit,) the Juzam or Indian leprosy, the Jewish leprosy, the Mormal, *Malum Mortuum* of the middle ages; the disease of St Paul's Bay, the *Scherlievo* or *Falcadina*, the Sibbens, the Yaws, *Pellagra*, Asturian Leprosy, *Acrodynia*, and the disease of Melada in the Gulf of Venice. He then adverts to some other less known diseases, to some of those which we know only by history, as the St Antony's Fire of the middle ages, and the sweating sickness of the fifteenth century, and the *Mentagra* and *Epinyctis* of the Romans; and he concludes the whole by a statement of the history of cow-pox and glanders.

At the end is given a Formulary or Pharmacopœia containing *formulæ* for the composition of the different medicines required either in the internal and general, or the external and local treatment of the diseases of the skin.

From the extensive range which M. Rayer takes, it is easy to perceive that he has given a most enlarged and comprehensive view of the subject of Cutaneous diseases, in all their varied relations. To this we must add, that perusal will satisfy every one, that, by means of accurate learning, he has in this work adduced a body of most valuable information illustrative of the history and distinctive nature of the various affections of the skin, both primary and secondary, which have prevailed in different ages and countries. In this respect, indeed, the conduct of M. Rayer forms a beautiful and exemplary contrast to that of most of his countrymen. Instead of acting as if he believed that the physicians of all other nations were profoundly ignorant of the subject of which he treats, and disregarding the researches of the German, Italian, and English dermatographers, he manifests a most laudable desire to become acquainted with the writings of authors both of other ages and other countries, and great readiness to assign to every one his just merits as an observer, and recorder of facts, or even as a patron of opinions, and on all occasions selects, like an impartial and judicious eclectic, useful information, wherever it can be obtained, to illustrate the etiology, pathology, and therapeutics of the diseases of which he treats. The present work, indeed, gives the most complete view extant of the literary history, etiology, and treatment of Cutaneous diseases; and we recommend it to the attention of the student, as a treatise in which he will find every thing calculated to furnish useful instruction, and gratify rational curiosity.

Of the translation by Dr Willis we have only one remark to make. It is in every respect worthy of the original; and in some points we think the work has been improved by passing through the hands of Dr Willis. M. Rayer may indeed regard it as a fortunate circumstance, that his work has been translated by Dr Willis. For such an undertaking not only are respectable and correct knowledge of the niceties and idiomatic peculiarities of the two languages required on the part of the translator, but as much accurate learning, if not more, than is possessed by the author, and knowledge of the subject inferior neither in extent nor precision. These accomplishments Dr Willis shows he possesses in a very eminent degree; and the translation now given to the English reader may be recommended as an admirable model of the manner in which a scientific work should be translated.

Dr Willis has prefixed a table of contents, which was much wanted, and on some points unknown or imperfectly touched by the author, he has added several useful notes.

Art. VII.—*The British Medical Almanack*, 1836; to be continued annually.

This little publication deserves to be generally known and possessed by members of the medical profession, as it presents, in a convenient and compendious form, an immense quantity of information on points in which all are more or less deeply interested. Besides the proper department of Calendar, with Meteorological tables, it contains a chronological history or annals of medicine, marking all the important eras; lists of the various medical corporations and institutions; lists of the various medical schools and their teachers all over the united kingdom; tables illustrative of the mortality of the human race in various situations,—in armies, civil society, hospitals, &c.; a formulary of the new medicines; means of ascertaining the healthy and morbid states of the urine; rules for practising auscultation and percussion; and, in short, much curious and useful information, which could not be found elsewhere in any single volume.

Art. VIII.—*Principles of Chemistry*. By John Mack of Serampore College. Vol. i. 12mo, pp. 336. From the Serampore Press, 1834. English and Bengalee.

We believe, that all rational persons are agreed, that the most likely method of eradicating effectually the evils which superstition and fanaticism have inflicted upon the nations of India, is to teach them the principles of useful knowledge, and to instruct them in those arts which are calculated to ameliorate their physical and social condition. For this purpose, chemistry is one branch of knowledge which is extremely well adapted. As the youth of India become instructed in the facts and principles of physical science, they will gradually grow up into a well-informed, and consequently a rational and intelligent population.

It appears that Mr Mack has already delivered repeated courses of lectures on chemistry in Bengalee at Serampore College, to the native youth of India; and the present volume consists chiefly of the notes of that course of lectures. It is a respectable and well-arranged performance; and, while it seems wonderful that it has been possible in so small a compass to give so much matter, the brevity of the work renders it well calculated to accomplish the object for which it was composed.

The volume is concluded with an account of the steam-engine, of the parts of which an illustrative wood-cut is given.

The author expresses in strong terms his gratitude to Mr Douglas of Cavers, "to whose enlightened generosity," he says, "Serampore College is indebted for its well furnished laboratory of chemical apparatus." To this purpose Mr D. devoted L. 500 when Mr Mack was appointed; and the circumstance facilitated much the duties of the teacher. The example is worthy of record and imitation.

PART III.

MEDICAL INTELLIGENCE.

PHYSIOLOGY.

On Artificial Fecundation in Fishes, and on the Metamorphoses occurring in the Spawn of Fishes before they are moulded into an Embryo. In a Letter from D. M. RUSCONI, to Professor Gaspar Brugnatelli, of date, Banks of the Lario, 15th July 1835.—I have the pleasure to apprize you, that after various unavailing attempts made with the view of witnessing the first motions of organic life in the spawn of fishes, I have finally succeeded in overcoming the difficulty, which arises from the *ova* being most transparent, by reason of which I was able to observe some facts quite new, which support much more strongly the doctrine of *epigenesis,* and will assuredly give birth to other discoveries.

I effected artificial fecundation in the spawn of the tench (*Cyprinus tinca,*) and in that of the bleak (*Cyprinus alburnus;*) and I found that the *ova* of these fishes, before they are modelled into embryos, undergo some peculiar metamorphoses, which resemble most intimately those observed in the spawn of frogs and water newts; and I further saw, that in the *ova* of these tench and bleak, there is no part corresponding to what I named the *vesicula umbilicalis,* and which I found in the *ova* of the river perch (*Perca fluviatilis.*) These observations I shall publish as soon as possible. First, I shall specify what precautions must be employed in order to insure the success of artificial fecundation; then by a series of figures, all designed by myself, and with as much diligence as possible, I shall describe the peculiar metamorphoses of the *ova* of these tench and bleak, and their successive evolution, to the period at which the fish being completely organized goes in quest of food; and I shall further demonstrate the successive formation of the brain in these animals,—which will constitute the most important part of my observations.

You are aware that M. Serres, in his work on the Brain, considered in the four classes of Vertebrated Animals, has given the history of the developement of that organ as observed by him, in the embryos of Mammalia, of Birds, and of Reptiles, and has omitted the embryos of fishes; because in order to give the history of the developement of that organ in this class of animals, it was requisite previously to effect artificial fecundation, and then to overcome all the difficulties which spring from the extreme minuteness and transparency of the *ova.* My observations, therefore, will furnish M. Serres with the means of being able to supply this chasm left in his otherwise valuable work, and will at the same time open to the cultivators of Natural History, the path to a new and interesting process in the successive organization of fishes.

You are aware that with regard to the metamorphoses of the spawn of frogs, I was anticipated by MM. Prevost and Dumas. The publication of this letter will prevent me from undergoing a second time the unpleasant feeling of seeing myself anticipated by any other naturalist in the communication of my observations.—*Printed at Pavia by Fusi & Co.*

PRACTICE OF PHYSIC.

On the Diseases prevalent at Fort Vancouver, Columbia River, North West America. From Letters, by Dr MEREDITH GAIRDNER, Medical Officer to the Hudson's Bay Company, dated between August 1833 and March 1835.—Dr Gairdner arrived in May 1833 at Fort Vancouver, in Lat. about 46° north, the principal station of the Company beyond the Rocky Mountains; situate on the north bank of the Columbia river, about 90 miles from its mouth on the Pacific, from which it is navigable thus far for vessels of 300 tons burden. The temperature in the summers of 1833 and of 1834 was from 78° to 89° Fah. during the day. "The winter of 1833—4, he says in the letters of March 1834, "had been one of the severest since the occupation of the Columbian territory by the whites. The frost set in on the 26th December, and continued to the end of January: the lowest temperature was +6° Fah. The Columbia, which is here 1670 yards wide, and from 6 to 7 fathoms deep, closed when the temperature fell to 14°, and continued frozen for about three weeks,—permitting a free traffic across it." But again, by his letters of March 1835, the following winter of 1834—5 was comparatively very mild; the thermometer not having been below 18° Fah.; but it was extremely wet. In the month of January alone "more than 10 inches of rain fell, and about the same quantity in December."

Fort Vancouver contains a population of nearly 500 whites, men, women, and children. On arrival, he found that the ague or epidemic intermittent, as it is there called, had raged for several seasons past with the most destructive violence, especially among the native tribes. By the aid of the chief factor, he quickly established an hospital, containing a ward of 12 beds for men, another of 6 for females, and a third of 12 for Indians. Dr G. had also to prescribe and dispense medicine to many cases that were not in the hospital or under daily treatment, and besides to those from a distance.

Of this disease, in August 1833 and March 1834, he writes. "It has regularly broken out about the beginning of August each year during the hot season, which succeeds the annual rise of the Columbia, ever since 1830, about which period the whites commenced their agricultural operations here, and it is threatening speedily to sweep off the whole Indian population in the country watered by the Columbia and its tributary streams, between the maritime chain and the Pacific. It has, however, as yet been productive of but little fatality among the whites, though it impairs the efficiency of the establishment at the season when this is most wanted.

It is difficult to say correctly what cause produces this epidemy. It can hardly be ascribed to the exhalations arising from the stagnant waters left on the subsidence of the Columbia, which annually overflows its banks; for it was unknown among the Indians in former times, and when the river frequently rose to a much greater height than of late seasons. Something, I doubt not, is owing to the agricultural operations, which have been going on to some extent of late years, on rank vegetable mould, and often under a considerably high temperature of 80° to 89° Fah. This again is hardly applicable to the Indian villages, which have been attacked at a great distance from the Fort; but these Indians may have contracted its seeds here on their visits for the purposes of trade. To enter, indeed, upon its causes and mode of origin would give rise to an over-lengthened discussion for this sheet, and would puzzle those who always ascribe the disease to malaria. Be not startled when I tell you that there is something like contagion in its mode of propagation or spreading. It threatens to be the scourge of the Columbia.

When properly managed, it is completely under the command of cinchona and the arsenical solution. But when medical assistance is not at hand, it brings on, in a very short space, a most alarming remittent; and finally degenerates into a leucophlegmatic state and tendency to general anasarca, with visceral enlargement."

In October and November 1834, he writes, "During the year ending May 31, 1834, I had under treatment 393 cases, distributed over 350 patients; 98 of these cases were Indians, the rest were the company's servants or their families. Of these, there were dismissed as cured 290, convalescent 26, relieved 13, incurable 1, irregular 53, deaths 11. Of these cases 197 were intermittent, 21 syphilis, 20 gonorrhœa, 13 wounds, 12 phlegmon, and 9 ulcers.

"It may interest you to see a view of the cases of intermittent fever treated during that period, which I subjoin in a tabular form; as also a synopsis of Fort Vancouver Hospital report,—an institution which, as mentioned in my last letters, I got established in August 1833."

AGUE REPORT.

	M.	*F.*	*Tot.*
No. of cases. .	144	40	184
patients, .	90	30	120
Relapses, one, .	16	8	24
Do. two, . .	9	1	10
Do. three, .	2	0	2
Do. four, . .	3	0	3
Do. five, . .	1	0	1
Cases aged 20 to 50,	83	17	100
Do. do. above 50, .	3	0	3
Do. do. 5 to 20, .	48	19	67
Do. do. below 1, .	2	0	2
Do. of ascertained tertian type, . .	24	5	29
Do. do. quotidian type,	31	8	39
Type of the others not ascertained or irregular.			
Deaths. .			

HOSPITAL REPORT.

	M.	*F.*	*Tot.*
No. of cases, .	145	44	189
patients, .	106	27	133
Cases in whites, .	78	0	78
Do. in half-breeds, .	5	2	7
Do. in Sandwich islanders,	26	0	26
Do. in Indians, .	36	29	65
Do. aged 20 to 50, .	101	14	115
Do. do. above 50, .	3	0	3
Do. do. 5 to 20, .	41	17	58
Do. do. below 5, .	3	1	4
Do under treatment above 3 months, .	1	0	1
Do. from 31 days to 3 do.	15	2	17
Do. from 21 to 30 days,	10	6	16
Do. from 11 to 20 do.	30	7	37
Do. below 10 days,	100	17	117
Deaths, .	2	4	6

"Since my arrival here I have had six *post mortem* examinations. The prejudices of the people on this head are strong, the more so from the majority being Roman Catholics; but our chief factor or governor here has very liberally supported me on this head. I have lately had intelligence of the appearance of this epidemic ague among the SNAKES, by far the most numerous Indian nation on this side of the Rocky Mountains. It is a disease of so marked a character, that there can hardly be a mistake even on the part of the non-professional observer."

In letters of February 1835, Dr Gairdner adds, "The epidemic ague has been much less prevalent this last season than the preceding one. I have now some hopes that it may progressively disappear. There have been one or two sudden deaths in this complaint, apparently proceeding (as ascertained by dissection) from the effusion of a sanguinolent looking matter.

"Since arrival here, my cases in all now amount to about 750. Two-thirds of these are intermittent fever. As far as I can now judge it may be explicable on the received doctrines of *miasmata*. With reference again, however, to former letters on the agricultural operations; the breaking up of vegetable soil, which has lain undisturbed perhaps since the flood, is a fertile source of ague in the newly settled territories of the United States. One obscurity still hangs over this pestilence, viz. its being unknown previous to the year 1830, and bearing in mind that the annual floods of the Columbia were often higher before that period than at any time since.

"In the cure, besides the cinchona and arsenic, which my former letters have mentioned, I have tried a remedy, unknown in Europe, and which I have found in every case effectual in stopping the paroxysms, a species of the *Sabbatia*, called *Canchalagua* by the Spanish of New California, where it is indigenous. I have not yet seen the recent plant, having procured from St Francisco what has been used in this place. You must not, however, mistake me; for the *Sabbatia* has not yet been tried on a sufficiently extensive scale to raise it to the rank of a sovereign specific like the Peruvian bark."

In a letter of March 1835, he mentions that "The number of sick in hospital has varied during the winter from 12 to 20, besides the out-door patients.

"The most important cases in surgery may be mentioned. A dislocation of the hip-joint. In December last I was obliged to amputate in the middle of the *humerus* for a compound and comminuted fracture of the fore-arm. I was somewhat embarrassed for the want of proper assistants. The man is, however, now going about, the stump being almost entirely cicatrized. I have had another case of simple fracture of the *tibia*, now under treatment.

Our number of venereal cases has averaged more than usual these few months back. I find that chancres yield readily to local escharotics, accompanied by the internal use of the nitric acid. No secondary symptoms have as yet followed. For buboes, I find it always necessary to salivate.

My total number of cases now rises to more than 770, under regular treatment, besides out-door patients and casual prescriptions since my arrival at this station."

THERAPEUTICS AND MATERIA MEDICA.

On the Simple Antiphlogistic Method of treating Syphilis. By M. Devergie, Senior, Chief Surgeon to the Military Hospital of Gros-Caillou, (Archiv. Gen. de Medecine, Oct. 1835. 2d ser. Tom. ix.)—This Journal, we believe, was distinguished for containing very early if not the first notices of the treatment of the different forms of *lues venerea,* upon simple antiphlogistic principles, without the use of mercury; and the paper of Mr Hill, in the eighteenth volume, contains a full statement of the effects of that method of treatment for a considerable time in the Military Hospital of this city. The treatment according to these principles has been very extensively tried in various continental countries; and M. Devergie has been giving it a full probation in the hospitals to which he was or is attached in Paris, between the year 1815 and the present time, and has been enabled to furnish some important results.

I have shown in my *Clinical Report of the Syphilitic Disease,* that various French and Foreign physicians, between 1548 and 1833, treated venereal complaints without mercury, by strict regimen and other simple and rational measures. I propose to mention here the results which I have obtained from the year 1819 to the 1st September 1835.

I should mention that I had occasion, in my service in the army, to treat numerous cases between 1804 and 1815. Though educated in the belief of a specific *virus,* so generally received at the period of my studies, finding every where in Germany, where I was constantly stationed from 1806 to 1813, the same doctrine confidently avowed and put in practice, a little time and reflection satisfied me, that all the frightful evils which I had incessantly before my eyes were the effect rather of unseasonable treatment than of the disease itself.

During ten years that I was living with the same men, the division of Cuirassiers of General Nansouty, with whose habits, mode of life, temperance or excess, I was well acquainted, I ascertained that the primary symptoms, especially chancres, were often cured, without relapse, by attention to cleanliness, aided by sobriety and by the powers of nature, in certain soldiers who concealed their complaints, while, on the other hand, their comrades, more obedient to medical prescriptions, did not always escape consecutive symptoms by methodical treatment. These facts were not lost on me. Since 1808, but especially since 1818, I obtained rapid and certain cures in the treatment of secondary symptoms, either by sudorifics, conjoined with strict regimen, or by the latter means alone, in patients who had sufficient resolution and inclination to confine themselves to a scanty vegetable diet.

When at the close of 1814, I became attached as senior surgeon to the Val de Grace, I was very desirous to make trials for arriving at the same result in the cure of recent venereal symptoms, by rejecting the employment of mercurial remedies. The principles explained in the works then published on the subject, and so accordant with the facts observed by myself, were assurances that I should succeed. But more than one obstacle prevented me from making conveniently in the treatment of the venereal cases, the trials for which I was so anxious. Here as every where else, mercury under three forms, ointment, liquor, and pills formed in general the treatment of the primary affections. Physicians and patients showed themselves equally persuaded that this metal was the only remedy against their distempers. To propose publicly a reform would have been equivalent to provoking an anathema against me. I was therefore obliged to proceed with reserve.

Nevertheless, from 1819 to the month of April 1835, when I quitted the division of the venereal cases, aided by most of the pupils, I had several opportunities of introducing freely in the treatment of this class of patients, the improvements suggested by experience and reasoning. Those who already victims of the effects of mercury, refused to take more, when symptoms recently contracted brought them again to the hospital, fell naturally under my care. As to those who believed that mercury was the true specific, I began mercurial frictions in small doses, one drachm every two or three days, after the acute stage was over. Already sparingly nutritive regimen, local blood-lettings, and rest had effected an important modification. Time passed; the cure advanced; and *seven or eight drachms* of mercurial ointment were sufficient to put these soldiers in a condition to quit the hospital after an abode of *thirty or thirty-five days.* Those, on the contrary, who were subjected to the ordinary mercurial treatment, used from *four to five ounces* of ointment, without counting the pills of Belloste (Ratier's Formulary, p. 123;) taken in the interval between the frictions, and left the hospital only after fifty-five or sixty days. When the patients suffered themselves to be guided without anxiety as to the mode of treatment, I suppressed altogether the mercurial preparations; and I arrived, nevertheless, at the same end; that is, of curing the patient more rapidly than by the ordinary method. Instructed by so many observations, agreeing with those afforded by my civil practice, I no longer doubted that *recent syphilis* might also be cured by simple and rational treatment. From this time mercury performed only a secondary part in my practice in the city. I soon renounced it almost entirely, and treated my patients by the antiphlogistic method.

This method furnishes several genuine advantages. 1. I studied the different symptoms presented by syphilis quite uncontaminated by mercurial treatment. 2. I was able to estimate the progress and duration of each of the symptoms, primary or secondary. 3. I could distinguish the symptoms produced by the abuse of mercury or other stimulants, which, by their very energetic action, change, vitiate, or complicate venereal affections so much, that they degenerate then into what the English practitioners call *pseudo-syphilis.* 4. I learned that relapses, or the formation of secondary symptoms, are much less frequent and less severe after this treatment than after that by mercury. These results are confirmed by the recent writings of modern French and foreign authors.

From January 1835 to September 1835 I treated at Paris, in the city and in hospitals, more than 6000 venereal patients; whom I distinguish into three epochs.

1. Patients treated from 1815 to 1830 in the city and in the Val de Grace, - - - - - - - 1402

2. Patients treated from 15th June 1831 to 1st September 1832 in the Val de Grace, - - - - - - 2000
3. ——————from the 1st of August 1833 to the 1st September 1835 in the Gros Caillou, - - - - - 1910
4. —————— from 1830 to the 1st September 1835 in the city, about - - - - - - - 800

This division will show best the difference between the time employed in treatment, especially in the number and severity of the secondary affections, which were more considerable in the first period than in the three others, since the general mercurial treatment was followed with more perseverance.

First epoch from 1815 to 1830. I treated at the Val de Grace and in the towns, by simple and modified mercurial remedies, 1402 patients. But as the notes relating to 294 are partly mislaid and partly inaccurate, I deduct these, and reckon only 1108, which are distributed in the following manner.

Inflammation of the *urethra, glans, vagina,* - -	248
Val de Grace from 1819 *to* 1825.	
Primary symptoms, secondary and consecutive, treated by moderate use of mercury, - - - -	229
Primary symptoms treated without mercury, - -	90
Secondary symptoms, mercurial and chronic, - -	118
Civil practice from 1819 *to July* 1830.	
Primary symptoms, - - -	306
Consecutive symptoms, mercurial and chronic, - -	117
Total, - -	1108

These 1108 venereal cases presented 1428 symptoms and 67 organic complications.

Mucous system.	Symptoms in	368
Cutaneous, - -		779
Glandular, - -		229
Osseous, - -		36
Fibrous, - -		16
Organic complications, -	67	
		1428

The 248 urethral, glandular, and vaginal inflammations, were almost all treated in town. 24 were slight, 137 acute, and 87 complicated with *orchitis, phimosis, paraphimosis,* adenitis, ophthalmia, visceral irritations, and 21 strictures.

According to the declaration of the patients, these symptoms were contracted with the following orders of persons.

1st, 61 suspected females; *2d,* 166 unsuspected married women and girls; and *3d,* 8 pregnant women. Among the 166 unsuspected married women and girls, 112 had whites more or less copious, and 54 were menstruating.

Of the simple, complicated, or phagedenic ulcers, and the simple or double buboes, 172 were cured by modified mercurial treatment, and 321 by simple treatment.

The mean duration of treatment cannot be precisely specified, since most of the patients did not confine themselves strictly to the regimen prescribed, and continued to attend to business. The duration of the treatment was, however, greatly shortened. It varied from thirty to thirty-five days, often from twenty-five to thirty days; while, by the ordinary mercurial treatment, either at the hospital or in town, it varied from thirty to sixty days.

The secondary, chronic, and mercurial symptoms, 367, consisted of

1st, 13 chronic ulcerations, phagedenic and cancerous, of the penis, 2 of which required amputation.

2d, 14 deep chronic ulcerations of the groin, the consequence of suppuration buboes.

3d, 8 old ulcerations of the *alæ nasi,* and upper lip.

4th, 54 ulcerations of the tousillo-palate and pharynx.

5th, 47 ulcerations in the nasal *fossæ,* at the skin, at the anus.

6th, 61 vegetations of the penis, anus, and tongue.

7th, 51 axillary, inguinal, and cervical buboes.

8th, 60 pustular syphilitic eruptions, partial or general.

9th, 39 *periostoses, exostoses,* and osteocopal pains.

10th, 13 cases of caries in the frontal, sternal, nasal, and other bones.

11th, 7 cases of *alopecia,* tubercular eruptions, horny concretions.

Of these cases, 132 were subjected to modified mercurial treatment.

Regimen, strict and unstimulating, observed as exactly as possible by the majority of the patients, remarkably abridged the duration of the treatment. It varied in the majority from thirty to fifty days, in some from two to three months; several months in cases of *caries.* The mean duration of the mercurial treatment of these symptoms was previously from 85 to 90 or 100 days, and often still longer; in some cases years.

Second Epoch. From the 15th June 1831 to the 1st September 1832, I treated at the Val de Grace 2000 venereal cases. I give here only the result of the observations collected from 1380 for two reasons. The first is the epidemic cholera, which required the evacuation of the venereal patients to other military or regimental hospitals, to convert my wards to the use of the fever and cholera patients. The second cause was, that a tedious and severe illness compelled me for more than six months to interrupt my attendance and habitual duties.

These 1380 patients furnished 1824 symptoms reputed syphilitic, exclusive of gastric complications, such as intermittent fevers, attacks of gastritis, enteritis, gastro-enteritis, small-pox, chicken-pox, rheumatic attacks, cephalalgic attacks, jaundice, &c.

The 1824 symptoms are distributed in the following manner.

In the mucous system, -	547
In the cutaneous system, - -	783
In the ganglionar and glandular system,	490
In the osseous system, - -	1
In the fibrous system, - - -	3
	1824

The 1380 patients may be classified in the following manner.

	Men.	*Days.*
Inflammations of the *glans* (*balanitis,*) prepuce, (*posthitis,*) and inflammations of both parts (*balano-posthitis,*)	31	17
Simple or acute inflammations of the urethra, -	244	26
Chronic urethral inflammation, or those without stricture,	15	45
Urethral inflammations complicated with *phimosis, balanitis, paraphimosis,* or ophthalmia, - - -	12	36
Cases of *paraphimosis,* simple or ulcerated, -	19	20
Cases of *paraphimosis* complicated with urethral inflammation, buboes, - - -	6	27
Cases of *paraphimosis,* complicated with ulcers or with buboes,	1	120
4. Simple inflamed testicle, *orchitis,*	64	24
5. Ulcers of the *penis,* alone or multiplied, -	297	23
———— complicated with buboes, -	97	36
———— of the penis, complicated with inflammation of the *glans, phimosis,* - - -	52	47
———————— complicated with buboes, urethral inflammation, *phlebitis,* - -	24	42
6. Acute buboes, suppurated, or chronic, - -	297	33

	Men.	*Days.*
Acute buboes, complicated with inflammation of the *glans*, *urethra*, ulcers, &c. - -	35	40
7. Vegetations on the penis, - -	12	26
——— complicated with urethral inflammation, ulcers, buboes, - -	27	39
Vegetations at the anus, rhagades and fissures, -	49	31
8. Pustules on the scrotum, - -	6	24
9. Syphilitic eruptions, tetters, - -	10	33
Syphilitic sores, complicated with ulcers of the penis, preputial inflammation, bubo, vegetations, urethral inflammation, - - -	20	49
10. Amygdalo-pharyngeal ulcerations, - - -	18	27
——— complicated with rhagades and fissures, - -	6	37
——— complicated with pustules on the scrotum, and urethral inflammation,	3	38
11. Osteocopal pains, periostoses, exostoses, -	3	45

The simple dietetic treatment was followed in all, with the subsequent exceptions.

Seventy-one employed the bitter depurative syrup without addition, and the sudorific ptisan.

Six employed the ptisan of Feltz or the water of Pollini.

Ten used mercurial preparations, as the proto-ioduret and the liquor of Van Swieten in minute doses.

Three attacked with buboes or chancres died, two from confluent small-pox, one from gastro-entero-cephalitis.

Third Epoch. From the 1st of August 1833 to the 1st of September 1835. At the former date, when I undertook the duty of the first division of venereal cases at the Military Hospital of Gros-Caillou, I pursued the same mode of treatment as at the Val de Grace, with the following results.

1910 patients presented 2276 symptoms, and 244 complications distributed in the following manner.

In the mucous system, - -	794
In the cutaneous system, - -	895
In the ganglier and glandular system, -	593
In the fibrous system, - -	6
In the osseous system, - - -	1
Different organic complications, - -	244

They are classified in the following manner:

	Men.	*Days.*
1. Inflammation of the glans, prepuce, and of both parts,	26	14
——— complicated with fever, gastritis, &c., - - - - - -	6	32
Simple urethral inflammation, - - -	196	19
Acute urethral inflammation, - - -	224	29
Chronic urethral inflammation, with or without stricture,	107	58
Chronic urethral inflammation, complicated with bubo, amygdalitis, pustules, inflammation of the bladder, of the mouth, fevers, vegetations, phimosis, rheumatism, and erysipelas.	89	57
Urethral inflammation, complicated with acute *orchitis*,	69	34
——— chronic *orchitis*,	36	57
——— double *orchitis*,	5	38
3. Chronic *orchitis*, alone or complicated, - -	18	44
4. Ulcers on the penis, simple or multiplied, - -	347	27
——— indurated, - - -	33	52
——— phagedenic, - -	26	60

	Men.	*Days.*
Ulcers in the penis, complicated with *adenitis* and gangrene,	1	120
—— with urethral inflammation,	49	35
—— with acute buboes,	76	34
—— with suppurated buboes,	29	67
—— with chronic buboes,	37	59
—— with *phimosis*,	32	58
—— with *orchitis*, inflamed *glans*, vegetations, eruptions, jaundice, *rhagades*, &c.	74	39
5. Buboes suppurated,	92	56
acute,	53	29
indurated,	75	56
scirrhous,	6	67
complicated with rose, *rhagades*, chops, ophthalmies, amygdalitic inflammation, gangrene of the scrotum, fever, &c.	43	69
6. *Paraphimosis*, simple and ulcerated,	14	26
7. Pustules on the *scrotum*,	2	30
8. Vegetations on the penis,	31	32
—— complicated with syphilitic sores, *rhagades*,	4	64
Vegetations at the anus and rhagades, *condylomata*	45	43
complicated with tonsillar inflammation, *gastro-enteritis*, &c.	33	60
9. Ulcerations, nasal, alar, and labial,	2	146
—— amygdalo-pharyngeal,	12	39
—— complicated with gastritis, pustules, and fever,	12	60
10. Syphilitic eruptions, tetters, &c.	23	54
—— complicated with *rhagades*, tonsillar inflammation, strumous affections, urethral inflammation,	13	59
11. *Periostoses*, osteocopal pains, *exostoses*,	6	53
12. Fissures not venereal,	2	30

Seven deaths arose from the following causes.	*Patients.*	*Days.*
Two, typhoid affection and ulcers of the penis,	2	64
Two cases of *gastro-enteritis*, with gangrene of the scrotum, and urethral inflammation,	2	132
One case of general arthritis, with ankylosis and caries of the hip-joint, the consequence of urethral inflammation,	1	81
One of sudden death, apoplectic from four scirrhous tubercles in the brain,	1	31
One of ileo-lumbar abscess, with *gastrocolitis* and severe ptyalism, the consequence of mercurial treatment par V. Swieten's liquor, and with frictions in a feeble subject attacked with subfascial bubo,	1	71

Seventy-four patients employed the bitter depurative syrup and the sudorific ptisan.

Fourteen patients used the syrup with proto-ioduret of mercury.

Four patients used baths with bichloride of mercury and the depurative syrup.

One patient employed frictions and the syrup without success for large vegetations.

The duration of residence under treatment, compared to that of the second period, is in general longer for all the symptoms. This is ascribed to the following causes.

1. To the dampness of two wards containing eighty beds, which in winter and autumn induced numerous organic complications.

2. To the necessity of the patients, often imperfectly covered, crossing at all seasons a court, exposed to the open air, to the water closets.

3. To many venereal patients being sent by regimental waggons after unsuccessful treatment from twenty-five to thirty days, during which the symptoms were aggravated.

4. To unauthorized supplies of food which the patients procure by the hospital attendants.

5. To aggravation of the symptoms in seventy-six patients with chancres, and buboes, with pustules, &c. subjected for five weeks to general mercurial treatment by the liquor and frictions, as shown by the journals.

In town I treated about eighty patients affected with various symptoms of syphilis. Though it was impossible to keep correct notes of so many, the following results may be relied on.

1. A number of acute urethral inflammations, gonorrhœa, about 350.

2. Many cases of chronic urethral inflammation, maintained by indurations and stricture, or one or more points of the urethra, the consequence of astringent injections; all treated with cauterization, alternated with dilatation, and latterly by forcible catheterism after the method of M. Mayer, 110.

3. Ulcers of the penis, one or manifold, cases of *phimosis*, of buboes, about 100.

4. Consecutive symptoms, such as ulcerations of the nose, tonsils, and pharynx, syphilitic eruptions, vegetations on the penis and anus, serpiginous ulcers, caries of the frontal and nasal bones, *exostoses*, *periostoses*, and osteocopal pains, alopecia about 200.

Almost all these secondary symptoms had been already treated by mercurials, more or less profusely administered in different forms, and most of them owed their existence only to the abuse of these preparations in excitable constitutions.

The basis of treatment was the employment of the depurative syrup, wherever the simple vegetable treatment did not effect a cure in patients desirous to attend to business and other pursuits. These cures it was often difficult to effect, and the treatment lasted from five to six months for most cases, and in some longer.

In the exceptions, the remedies used were the Rob of Laffecteur, the proto-ioduret of mercury, some preparations of gold, the ptisans of Arnout, of Zittmann, and the treatment of Dzondi by sublimate. But the most generally successful means in the management of diseases of the bones was the water of Pollini.

Comparative view of the three epochs from 1815 *to* 1835. *Secondary symptoms, chronic or mercurial.* The result is highly favourable to the modifications introduced into the treatment of these diseases in so short a time. The first period presents among 1108 venereal patients a table of 367 secondary severe chronic affections, consisting of 203 alterations of the cutaneous texture, indicated by large vegetations, serpiginous and cancerous ulcerations of the penis, of the lips, of the *alae nasi*, of the groin, of the neck, &c.

In 7, cases of change of structure of the tongue.

In 54, cases of ulcerations of the mucous tissue of the mouth, of the soft palate, &c.

In 51 cases in changes in the glandular tissue.

In 52 cases, in changes in the osseous and fibrous tissue, distinguished by caries of the frontal, nasal, and sternal bones, *necroses*, *periostoses*, osteocopal pains.

The inspection of the same symptoms comprised in the second epoch (from June 1831 to 1st April 1832) presents a difference so striking, that it would be wonderful, was it not known that the works published in France by MM. Broussais, Jourdan, Richard, Desmelles, Dubled, Lefevre, Ratie, Cullerier, and Devergie, produced a great change in the treatment of syphilis, and modified the practice of physicians entrusted with the charge of several patients.

In 1380 cases, there were only 149 cases with secondary symptoms, viz.

122 affections of the skin, as vegetations, rhagades, syphilitic eruptions, tetters, &c.
24 cases of change of the mucous membranes, as amygdalo-naso-pharyngeal ulcerations.
3 affections of the osseous and fibrous system.

149 total.

The same proportion may be observed in the third period, in patients treated at the hospital.

In 1910 patients, there are only 174 cases of secondary symptoms of the following orders.

142 cases of affections of the skin, viz. vegetations, *rhagades*, syphilitic eruptions, tetters, multiform eruptions, &c.
25 cases of affection of the bucco-palato-pharyngeal mucous membrane,
7 cases of affections of the osseous and fibrous system, such as osteocopal pain, *periostoses*, and one *exostosis*.

174 total.

Even from these two lists of secondary affections (149 and 174) of the second and third period, a considerable deduction must be made; as they include vegetations which must be regarded as primary, *rhagades* supervening at the margin of the anus, unconnected with syphilis in men who have never cohabited with females, and many cases of multiform cutaneous eruptions, improperly sent to the venereal wards, when their origin is unknown, and which readily yield to the ordinary means.

This small proportion of secondary affections is in direct relation with the results by other physicians both French and foreign, entrusted with the care of venereal patients, and who have adopted the simple antiphlogistic method of treatment.

On the varieties of East Indian Opium. By Dr G. SMYTTAN. (*From the Sixth Volume of the Transactions of the Medical and Physical Society of Calcutta.* Calcutta, 1833.)—The varieties of opium found in European markets have been generally referred by drug-dealers to two or three general heads; one, known by the name of Turkey opium, described as solid, compact, opaque, of moderate specific gravity, and of a dark-brown colour; a second, distinguished by the name of East Indian opium, described as soft, and sometimes of the consistence of thick tar, ductile, and of a darker colour and more nauseous but less bitter taste; and occasionally a third said to come from Egypt, and reputed to be very excellent.

I. In these statements regarding the characters, especially of Turkey opium, and the excellence of Egyptian opium, most of the writers copy each other without actual examination of the articles.

1. It appears that the English market at least presents two varieties of opium brought from Turkey.

a. The first is what is proper Turkey opium, and the specimens which are regarded as best, instead of being compact, solid, and of dark brown colour, occur in masses about the size of the hand, soft, compressible, and elastic on the surface, not frangible, but sectile, and presenting on internal section, a viscid compressible mass, pretty firm and dry at the external crust, though still receiving easily the impression of the nail, and soft, moist, and approaching to semifluid in the centre. The colour varies, being in the external drier parts between deep reddish-brown and liver brown, and in the moister and softer portions lighter, between brownish red and chestnut brown, or something of the colour of the mineral grenatite, or between that and cinnamon stone The smell is not unpleasant, and like that of the bean-husk. In a specimen which we lately examined, the exterior presented the seeds of a species of *Rumex*. Does this indicate that it belongs to the Smyrna variety to be mentioned below?

It is remarkable that, notwithstanding the statements above noticed in all the books and dispensatories on the characters of good Turkey opium, experienced druggists invariably prefer Turkey opium, which is soft, compressible, and moist, as now described. Its internal section is much intermixed with leaves, and it is even possible to recognize the petals of the white poppy. This contains about five *per cent.* sometimes six of morphia. But the strength and purity of the very best Turkey opium vary so much that for this no rule can be laid down.

β. The second variety of Turkey opium is that denominated Constantinople opium. This occurs in much smaller masses, being sometimes not larger than the hand of an infant of one year, and weighing from fourteen drachms or two ounces to three ounces and a half or four, rarely more than that. The exterior of these masses, which are generally flattened and irregularly polyedral, is dry, hard, and of a broccoli brown colour, less perfectly covered with leaves, and showing smaller fragments of vegetable matter than the common Turkey opium. The masses externally are scarcely compressible, but they are not frangible but sectile; and the section is of a deep reddish, sometimes of chestnut brown colour, more uniform than that of the common Turkey opium, drier and firmer, and compressible, and receiving impressions only towards the centre. Some recent portions may be compressed externally, but they generally resume their figure. This opium is always procured from Constantinople, is believed to be reared with peculiar care in the country round the city chiefly for the use of the Turks themselves, is richer in morphia than the other species, and consequently brings in the market a higher price. It is occasionally impossible to procure it at any price.

γ. It further appears, that, in France is another variety of Turkey opium, known by the name of *Smyrna opium*, which is brought direct from that port, it is said, to Marseilles. This is in larger, rounder, and more irregular masses than the Constantinople opium; it has a black colour, especially internally, a stronger and ranker odour, and the cakes are covered with the seeds of a *Rumex*, which M. Merat ascertained to be those of the *Rumex Patientia*. This opium is stronger than the common Turkey reddish opium, dissolves readily in water, and is used chiefly to manufacture morphia, which is said in it to be abundant.

The Egyptian opium occurs in small, flat, irregular masses, sometimes less than those of the Constantinople variety. It is always extremely hard, compact, either difficultly compressible or quite incompressible; and though it may be cut, it is rather frangible than sectile. Its fracture is conchoidal and resinous, its aspect shining, and its appearance uniform. It is equally hard at the circumference and centre, but receives the impression of the nail, leaving a lighter streak. It is remarkable, that though this variety agrees with the characters ascribed to the best Turkey opium, and Egyptian opium has been celebrated as the best in the European market by all writers, from Alston, Lewis, and Pomet down to Dr Duncan and Dr A. T. Thomson, yet this is regarded by experienced druggists at the present time as much inferior to Turkey opium, and does not yield more than from 2 to 3 per cent. of morphia. It contains much caoutchouc and gluten.

It has been repeatedly stated by all travellers, from Chardin and Tavernier downwards, that the opium reared in Persia was of the best quality, and much superior even to Turkey opium; and while it is said that the genuine medicinal poppy is a native of Persia, and minute accounts of the effects of collecting opium on the persons engaged in it in that country have been given, it has been also said that all the best opium was brought from Persia. This may have been true about a century or 150 years ago. But at present we are assured by all experienced druggists, that either no opium is brought from that country, or what is brought is of inferior quality, or, in short, it is not genuine Persian opium.

It appears, therefore, that the best kinds of opium in the English market are the two varieties of Turkey opium. But even these are so variable in qualities, that the most practised druggists assert that it is impossible to predict, from the external characters and appearance, the probable purity or productiveness of the article as a medicinal agent. It has been commonly supposed that the strength of Turkey opium is about double of that reputed to come from the East Indies; and it is stated by Dr Anthony Todd Thomson to contain three times the quantity of morphia afforded by the latter. We have now to consider the information which Mr Smyttan has brought forward regarding the latter article.

II. From the account given by Mr Smyttan, it appears that the East Indian opium varies much in quality and strength, and that an inferior sort of it only has hitherto been sent to Europe;—a circumstance rather extraordinary, as it must be manifest that only good opium could pay so remote a carriage. In India, there are three sorts of opium known; the first, Bengal opium, or that reared at Behar and Benares, and generally known as opium of Patna and Benares; the second, known by the name of Cutch opium, not grown in that country, but imported from Malwa; and the third the opium of Malwa.

1. *a*. The Bengal opium, or that reared in the districts of Behar and Benares, is generally found in the form of large cakes or balls, weighing about three and a-half pounds each, thickly coated externally with leaves, which often amounts to thirty-two and a-half per cent. of the ball, hard, and of a dirty brown colour externally, but within soft, and often semifluid, like tar or treacle, and mixed with leaves to the extent of seven and a-half per cent.

Like Turkey or Constantinople opium it contains resin, caoutchouc to the extent of seventeen per cent. gluten three and three-qurters per cent. and earthy matter from four to ten per cent. In thirteen trials with specimens of Bengal opium of the years 1819 and 1820, it was found to afford upon an average rather more than two per cent. of morphia. In seven trials with specimens of Bengal opium, it was found to afford not more than two per cent. of morphia.

β. There are, however, two varieties of opium produced in Bengal, one termed *Ryotts* opium, because reared by the ryotts or husbandmen of Bengal; the other, *Bareilly* or *Bareilly-Lab*, both of very superior quality. The specimen of the former examined by Mr Smyttan, which was procured from plants grown in the vicinity of Dinapore encampment in 1817, was hard at the surface and soft externally, and afforded from four and a-half to five and three-quarters per cent. of morphia, or nearly the same as the best Turkey opium. The latter, the Bareilly opium, was obtained from some white poppy plants grown in a gentleman's garden at Bareilly in 1817, where they had been cultivated and irrigated with particular care, and from which the juice was collected in January and February, when the capsules were at their full size. The opium was compact, firm, and unyielding, sectile, of a deep brown colour, approaching to black, viscid to the feeling, of a brilliant aspect, with a strong narcotic smell, high flavour, and intensely bitter but not acid taste. This specimen afforded from seven and a-quarter to eight and a-quarter per cent. of morphia, which is nearly two per cent. more than the best Turkey opium,—an evident proof how much the energy and qualities of the drug may be increased by due attention to the cultivation of the plant.

2. There was found at one time in the bazaars a variety of opium called Cutch, which is supposed to be the produce of that country. This is indeed no longer found; and it is doubtful whether any opium was produced in Cutch. It appears at least from the testimony of Mr Burnes, Residency

Surgeon at Cutch, that no opium was produced there during the period of his residence there, and that all the opium found there, excepting a few parcels smuggled, was sent from Malwa by the collector of Ahmedabad.

A specimen of opium which had been seized as smuggled, and believed to be Cutch opium, was in round cakes varying from six to ten ounces in weight, and covered with a coating of rice husks, in which, while moist, it had been packed. This was darker in colour than the Bengal, but of a lighter brown colour than the Malwa opium, more tenacious and viscid than the Malwa opium, but less than that of Bengal, intermediate in consistence between the latter and the former, had a strong naueeous bitter taste, and a pleasant aromatic flavour without empyreuma. In one experiment it appears to have afforded one and a-half per cent. and in another three and three-quarters per cent. of morphia.

3. The third and most valuable variety of East Indian, is that from the district of Malwa. This occurs in the market in the form of small flat round cakes, varying from two to three or about two cakes and a-half to the pound, that is, at an average from five to six ounces each cake. When the cakes are globular, which is not common, the opium is adulterated. These cakes have little or no coating except their own crust with fragments of straw, poppy-leaf, or dust adherent; and though soft at first, four or five months after formation, they may be handled or cut without adhering to the fingers or knife. When a year made, the opium of these cakes becomes brittle in dry weather, and is liable to break into shining fragments upon falling or being struck with the knife, and attracts moisture in damp weather. Some of the cakes have a dark oily aspect externally, in consequence of the practice of the Malwa cultivators of preserving the recent juice in some bland oil. Other cakes are dry and almost white, or of the colour of bran, or that of the leaf in which they have been packed.

Malwa opium is internally of a light brown colour, leaves on paper an interrupted streak of a lighter brown colour than Bengal opium, and is more plastic and less tenacious. It has been said to be inferior in taste and flavour to Bengal opium, but when good it is said not to be void of fragrancy, and to be free from empyreuma.

Malwa opium contains resin in smaller proportion than Bengal opium, caoutchouc in very small quantity; in one instance it is said to have afforded none; gluten nearly to the same extent as Bengal opium, and earthy matter it is said from seven to twelve per cent. This is ascribed to the adherent dust, and to intentional adulteration.

In eleven trials of Malwa opium of several seasons, but chiefly 1818, 1819, 1820, it was found to furnish an average of rather more than three per cent. The result of seven trials of Malwa opium gave four per cent. of morphia. But while Malwa opium of 1818 and 1819 afforded only 1⅛ and 1¼ per cent. of morphia, that of 1820, afforded 4⅛, 4¾, and 5 per cent.; and two specimens furnished 5¼ (experiment 6) and 6 per cent. (experiment 4) of morphia.

Malwa opium is frequently adulterated by admixture with carbonaceous substances, jaggery or impure saccharine matter, honey, flour, aloes, catechu, turmeric, cow dung, and various earthy matters.

This species of opium has been hitherto little employed in medicine, nor is it known that any observations on its physiological effects on the system have yet been made. The chief market for it is China, where it is highly prized, and brings a greater price than Turkey opium. It appears, however, that the Malwa territory is capable of producing it to an almost unlimited extent, and Mr Smyttan thinks that if from any cause the supply of Turkey opium were to be interrupted or to fail, the deficiency might be supplied by the opium-growers of Malwa. It is calculated that not less than 12000 chests, or 480,000 pounds, were exported from Malwa in the year 1830; and he thinks that, as the merchants are now allowed to make their own contracts, and to export an unlimited quantity, it is not improbable that, from over production and consequent fall in price, it may at length become an article of export to Europe.

It is not unimportant to advert to the mode of cultivating the poppy and to the manufacture of opium in Malwa.

It appears that all the varieties of the *Papaver somniferum* are sown in Malwa; and the white, the red, the purple, and variegated are generally found indiscriminately in one field—a circumstance which Mr Smyttan thinks may affect the quality of the drug. The ryots prefer the purple, chiefly in consequence of the thickness and firmness of its capsules, which renders less skill and caution necessary in the operation of puncturing.

The immediate vicinity of the village is selected for the crop, both on account of the richness of the soil, the abundant supply of water, and the facility of giving that unremitting attention which the crop requires both in growing and in collecting the juice.

The poppy is usually cultivated as a second crop on ground which has borne one of Indian corn; but when manure is scarce and the soil bad, the first crop is made to supply nutriment to the succeeding poppy crop. Thus hemp is sown and allowed to grow till near inflorescence, when it is ploughed down and, decomposing, becomes manure. After careful ploughing and beating, in the close of November aud December, the seed is sown broadcast, at the rate of 2 or 2½ seers equal to 4lbs. or 5lbs. per beega, or third of an acre.

For facilitating irrigation the field is divided into small compartments or squares, which are well-watered two or three times before the plant springs, and five or six times during growth. Thinning and weeding are subsequently diligently performed.

In four months, with good sunshine and without frosts, the capsules are sufficiently large to be punctured,—an operation performed in Malwa by a small trident-shaped iron instrument, with three sharp prongs about the fourth of an inch apart,—introduced, so as to make three vertical incisions the evening before collection.

The field being divided into four quarters, the ripest plants are punctured first, and the fluid from these it generally takes a whole day to collect; so that in four days the first discharge of fluid is collected from the whole field. The milky exudation is scooped from the capsules by means of a blunt knife 2 inches long, and 2¾ broad, the blade of which is kept well-oiled. As the quantity collected increases it is removed from the knife, and deposited in a vessel of linseed oil, which preserves the fluid from change or evaporation. From the oil it is removed into *zhurras* or earthen jars, when it is called in the language of the natives *cheek*, in which state it is allowed to remain till after the rains, (October or November,) when is is formed into cakes.

This part of the process is performed with great care by an experienced person in a dry airy apartment free from leaks, and with the floor covered with mats and leaves, in which the cakes are left to dry but without exposure to the sun. After remaining in these, occasionally turned over for two or three months, they are fit for sale; but if allowed to remain much longer till they are well dried, their price is much enbanced. Twenty seers of juice, 1 equal to 40lbs. made into cakes is calculated to yield 16 or 16½ seers, equal to 32 or 33 lbs. of marketable drug. D. C.

Death of Professor Turner.—It is with feelings of deep regret that we record the death of Mr John William Turner, Professor of Surgery in the University of this city, after a short, but severe illness, brought on by exposure to wet and cold during the stormy night between Sunday 25th and Monday 26th October. Mr Turner was called out that night, in the discharge of his duty as one of the Surgeons of the Royal Infirmary, and was detained upwards of two hours in wet clothes. Though unwell from that time, he did not confine himself, but continued to be occupied with his professional visits, and latterly with the duties of his Class of Surgery, till Friday, November 6th. From this period, his complaints, which at first assumed a dropsical tendency, became more complicated and aggravated, till Thursday, November 12th, and after a few more days of severe illness, he died on the evening of Thursday, November 19th.

Mr Turner was born in England, but received his education in this country. He was educated to the profession of medicine by Dr Thomson, now Professor of Pathology, in whom he found combined the highest qualifications of a preceptor, with the warmest affections of a friend, and whose singular fortune it is to have educated nearly at the same time, two persons of such distinguished merit, as the late Dr Gordon and Professor Turner; and, to have seen both cut off prematurely in the full exercise of their talents, and amidst the fairest promise of an honourable and useful career.

During his medical education in Edinburgh, Mr Turner enjoyed the best opportunities for the acquisition of practical knowledge, in the situations which he held of Surgeons' and Physicians' Clerk in the Royal Infirmary; and on the completion of his studies made a voyage to India, in the capacity of surgeon to an Indiaman. After his return, he served for some time as Assistant Surgeon of Militia, and subsequently, along with the late Dr Erskine, whom he assisted in private practice, had the medical charge of the Artillery at Leith Fort.—After the death of Dr Erskine, Mr Turner was the assistant of Dr Thomson for a period of nearly ten years. When the establishment of the New Town Dispensary was proposed by Dr Thomson in 1816, Mr Turner, with Dr Alison, took an active share in its arrangement, and by his energy, greatly contributed to enlist in its favour the voice of the public and of the profession, which it has ever since retained. He was for many years one of the surgeons, and afterwards Consulting Surgeon,—a situation which he held at the period of his death. In all these situations, Mr Turner enjoyed for acquiring practical knowledge in his profession, extensive opportunities, which his powers of ready, but accurate observation, and his sound judgment, enabled him to turn to the best account.

Mr Turner was admitted a Fellow of the Royal College of Surgeons in 1812, on which occasion he published a Probationary Essay of great ability, on Dislocations of the Shoulder Joint. As a member of this body, he took an active part in the extension and arrangement of their Museum, which had been commenced in 1804, at the suggestion of Dr Thomson, and he was for a considerable time Conservator. His anxiety to promote this important object continued unabated through life, and when the College lately resolved to publish a Descriptive Catalogue of their collection, Mr Turner was selected to be convener of the committee appointed to prepare the catalogue for the press,—a work on which he bestowed a great deal of time and pains, and which, without his knowledge of many of the objects, could not have been satisfactorily completed;—and within a few days of his death, he received the unanimous thanks of the College on the completion of this last of many labours which he had performed in their service.

In 1821, Mr Turner was appointed Professor of Surgery to the Royal College of Surgeons, on the resignation of Dr Thomson. The duties of this appointment, he performed with so much talent and judgment, as could not have failed to bring him into public estimation, as an able and successful teacher, and a high authority in surgical practice, but for the interruption occasioned by repeated illnesses, which retarded his advancement. During the time that his health was infirm, he went to Paris on the invitation of Lord Holland, with whom he lived as medical adviser for a considerable time, and he spent a summer in the Highlands of Scotland with his Grace the Duke of Bedford, in a similar capacity. By these noblemen, and their families, the merits of Mr Turner were highly appreciated.

In 1829, Mr Turner was appointed one of the Surgeons of the Royal Infirmary.

In 1831, Mr Turner's health appeared to be restored: and when his Majesty's Government resolved to institute a separate Professorship of Surgery in the University of Edinburgh, Mr Turner was appointed to fill that Chair. The renovated state of his health enabled him to direct the energies of his vigorous mind with renewed success to this department of medical education. The intimate and accurate knowledge he evinced both of the principles and practice of surgery, the perspicuous manner in which he communicated this knowledge, and the admirable method he pursued in the examinations of his class, with his firm, yet friendly and conciliating conduct towards the students, qualified him in no ordinary degree for the duties of a Professor, and obtained for him not only the respect and affection of his pupils, but the fullest confidence and approbation of his colleagues in the University, and of the most eminent of the medical profession. Under these circumstances, the death of Professor Turner must be viewed as a great public loss.

Mr Turner's conduct towards his patients was such as to make him highly valued as a professional adviser, as one who, without pretension or affectation, practically evinced the sufficiency of his knowledge, and who ever brought with him those soothing attentions and friendly encouragements, which form not the least efficacious expedients of the healing art. Towards his professional brethren, his conduct was marked by the most delicate attention to their feelings, and the most scrupulous regard to their interest.

Mr Turner's writings on professional subjects are not numerous. His taste was too correct, and he was too careful of reputation to write for mere authorship; but we know that in the Reports of the New Town Dispensary, and in notices of the prevalent epidemics in Edinburgh, he contributed anonymously much useful information. Latterly, the papers which he published in the Transactions of the Medico-Chirurgical Society of Edinburgh, of which he was a Vice-President, "On the Causes of the sound produced by the action of the Heart;" and "On the sudden spontaneous obstruction of the Canals of the larger Arteries," bear the stamp of accurate observation and research, and ingenious reasoning; and the admirable manner in which his lectures on Surgery were composed, gives additional cause for regret that he did not live to publish a work on the principles of that branch of science.

Professor Turner's mind was of no ordinary cast. Gifted with excellent talents and sound judgment, improved and strengthened by habits of observation and reflection, and combined with great decision and manly sincerity, there were few circumstances either of a professional, general, or personal nature, in which those who consulted him did not derive benefit from his advice in solving their doubts and guiding their proceedings. He had, indeed, a remarkable and almost intuitive perception of the difficulties and advantages of different lines of conduct, which caused his advice to be much and justly valued by those who knew him, and which enabled him to anticipate events and consequences overlooked by others, and to shape to himself a decided and secure course, in situations calculated to create difficulty and embarrassment.

Professor Turner died in his 46th year. The interment took place at Newbattle, with which his family had long been intimately connected, and where he spent his early years. The Senatus of the University, and the Royal College of Surgeons, as a mark of their respect, assembled to meet the funeral at their respective Halls, and have put on record the high sense they entertain of Professor Turner's merits.

Sir Charles Bell was, on the 8th December, unanimously appointed by the Patrons to the Chair of Surgery.

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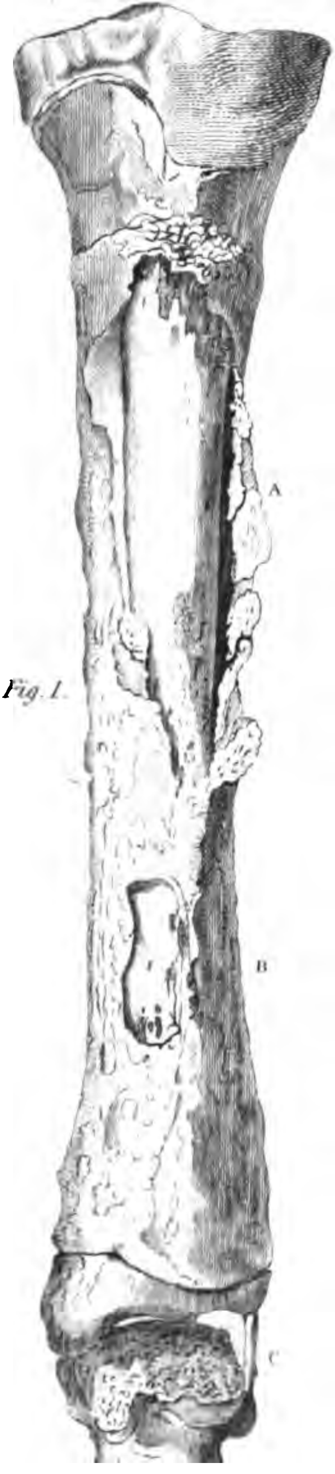
PLATE I.



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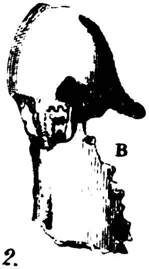

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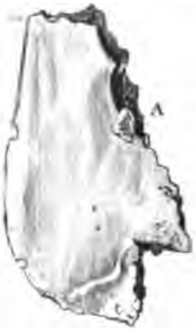

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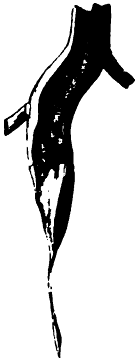

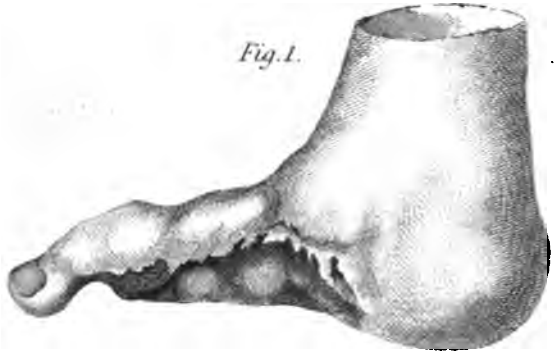

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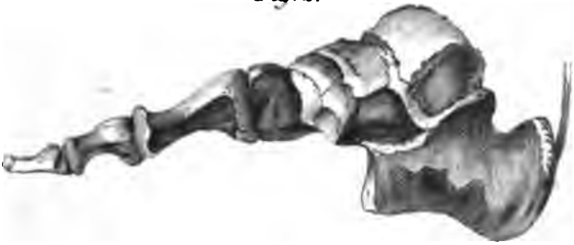

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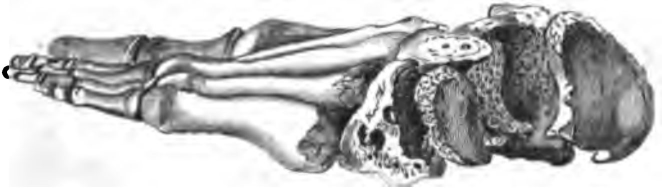

Mr. SYME'S CLINICAL REPORT.

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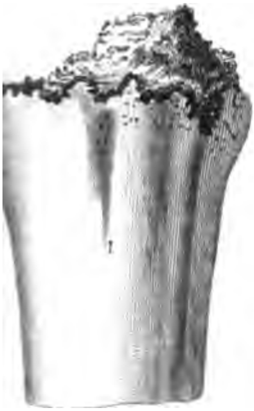

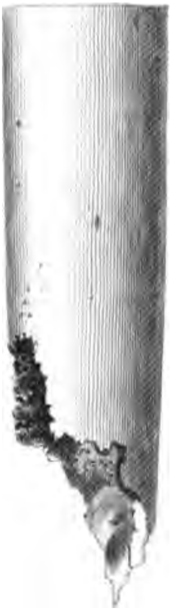

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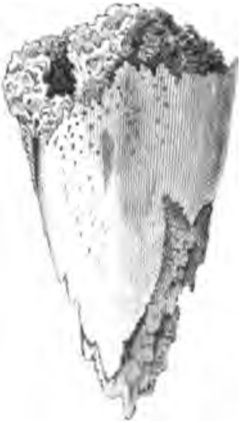

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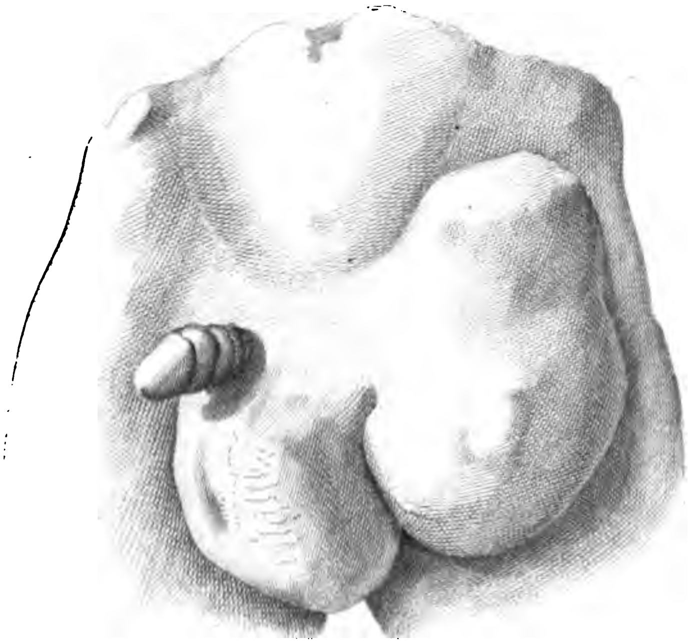

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MR INGLEBY'S PAPER ON FIBROUS TUMOURS IN THE UTERUS.

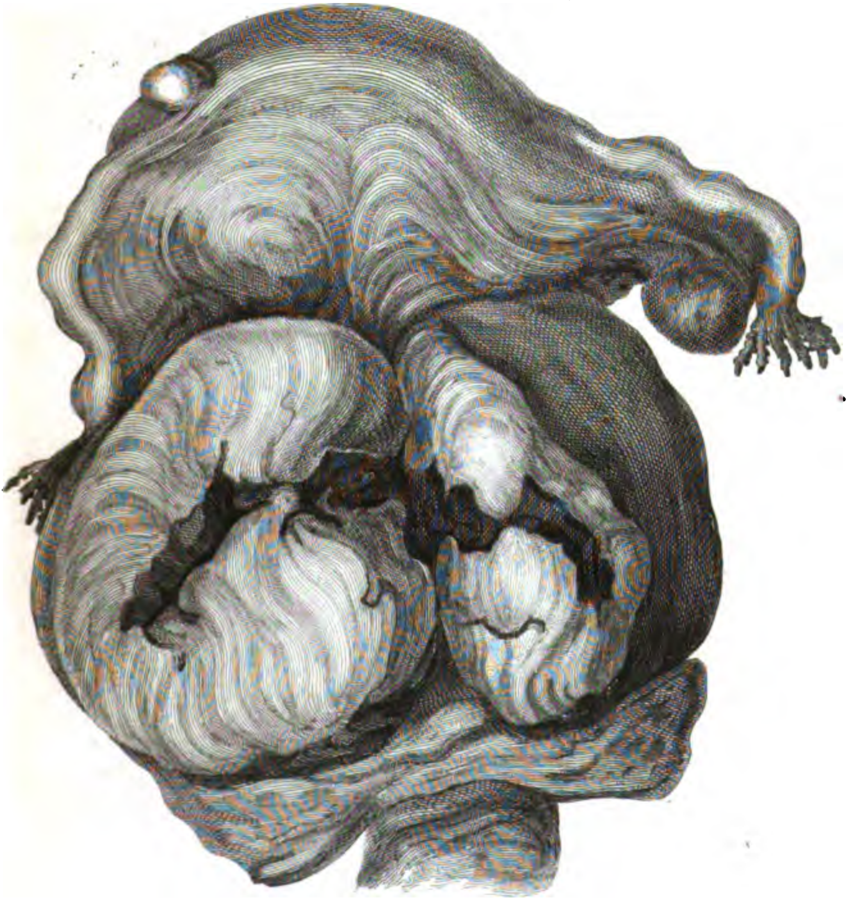

Fig. 2.
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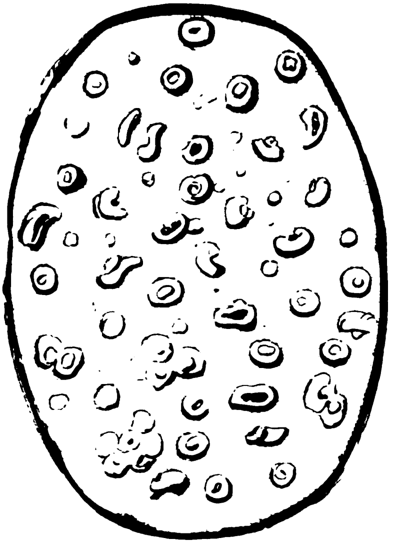

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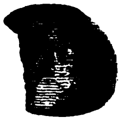

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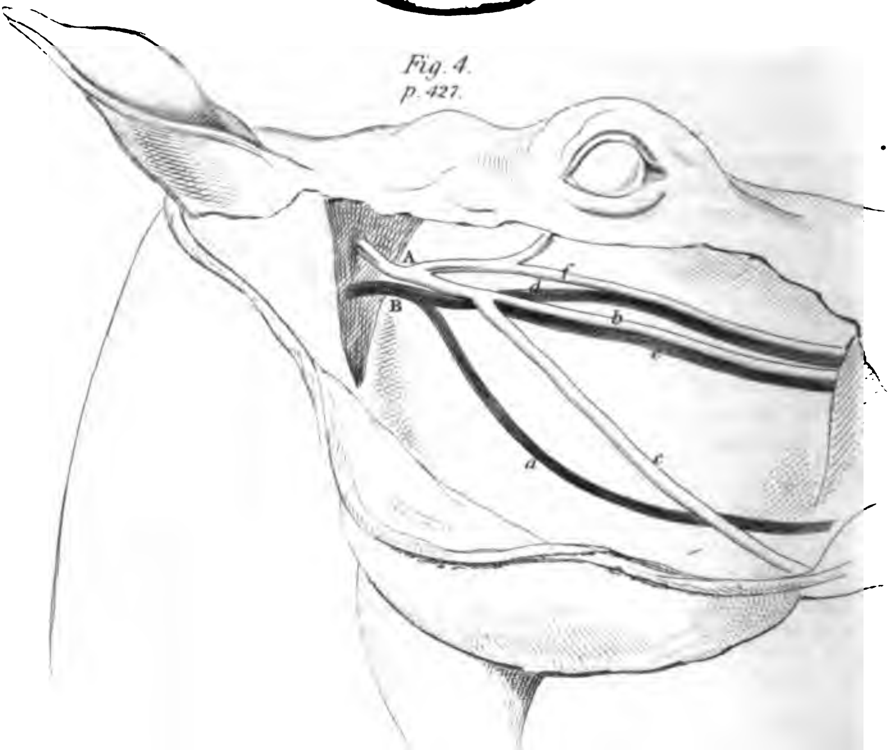

THE

EDINBURGH

MEDICAL AND SURGICAL JOURNAL.

1. APRIL 1836.

PART I.

ORIGINAL COMMUNICATIONS.

ART. I.—*Pathological Observations on the Diseases of the Placenta.* Part I. *Congestion and Inflammation.* By JAMES Y. SIMPSON, M. D., President of the Royal Medical Society of Edinburgh, &c. (Read before the Royal Medical Society, November 20, 1835.)

THE Diseases of the *Placenta* form a subject of inquiry which appears to have hitherto attracted, especially from British pathologists and accoucheurs, a very incompetent share of attention. In the works of various systematic medical and obstetrical authors of the last and of the preceding century, as in those of Bonet, Ruysch, Mauriceau, Morgagni, and Wrisberg, notices of some individual cases and forms of placental disease are occasionally to be met with,—and more lately, several of the morbid affections of this organ have been investigated with greater or less attention, by different continental pathologists,—as by MM. Murat,[*] Desmoreaux,[†] Brachet,[‡] and Cruveilhier,[§] in France, and by Professors Stein,[‖] D'Outrepont,[¶] and Wilde,[**]

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[*] Dictionnaire des Sciences Medicales, Tome xlii. p. 543. sqq. 1820.

[†] Dictionnaire de Medecine, Tome xv. p. 379. 1826.

[‡] Journal Generale de Medecine, Tome cii. p. 10. sqq. 1828.

[§] Anatomie Pathologique, Livrais. i., vi., and xvi. 1829–34.

[‖] Gemeinsame Deutsche Zeitschrift für Geburtskunde, Band v. Heft. 2, and Kleinert's Allgemeines Repertorium, v. Jahrgang. 1. Heft. s. 35, 36. 1830.

[¶] Gemeins. Deutsche Zeitschrift für Geburt. Bd. v. Heft. 4. and Kleinert's Allgem. Repertor. iv. und v. Jahrg. Suppl. i. Abtheil. s. 77. 1830.

[**] Medizinsche Zeitung. Jahr. ii. Abtheil. 11. Berlin, 1832.

in Germany. I am not aware, however, that the medical literature of England contains any account of the various morbid states to which the *Placenta* is liable, besides what is to be found in the casual observations and in the details of isolated and incidental cases recorded in the obstetrical writings of Smellie, Denman, Hamilton, Burns, Ramsbotham, Ingleby, Montgomery, Granville, and others.* It is not, therefore, without hesitation, that I venture to lay before the Society, the following general remarks upon some of the principal forms of placental disease, as derived, partly from the data furnished by others, and partly from the observations which I have myself had an opportunity of making upon a few recent, and a very considerable number of preserved specimens of morbid *Placentæ*, contained in the different pathological museums of this country. At the same time, I may, I hope, be allowed to plead in excuse for the many imperfections of the following essay, the comparative novelty of the subject of which it treats, the paucity of materials still existing with regard to it, and the difficulty of collecting these materials from the numerous different sources over which they are scattered.

The Human *Placenta* is an organ which serves as a mere temporary medium of communication between the mother and *fœtus*, and passes through all its different stages of formation, growth, and ultimate expulsion, in the short space of seven or eight months, yet during this comparatively brief existence, it appears to be liable to a considerable number and diversity of morbid conditions, more frequent, I believe, in their occurrence, and more important in their effects, than seems to be generally suspected. Nor are the morbid conditions and lesions of this organ matters of pathological curiosity and interest only; a more accurate knowledge of their various phenomena appears to promise results of no inconsiderable consequence to practical medicine. The peculiarities of the placental economy of the human female, and the nature of the relations which exist between it and the *uterus*, constitute (particularly when these relations happen to be deranged by placental or uterine disease,) one of the great sources of danger and fatality in human parturition. Numerous facts also seem fully to prove, that different morbid actions and lesions of the *placenta* exert a marked and powerful influence upon the health and well-being of the mother during pregnancy,—and, above all, the study of these lesions promises to throw an almost entirely new light upon the abnormities of developement, the diseases and death of the *fœtus in utero.* Most, indeed, of the latest inquiries instituted upon these points, appear to me to afford satisfactory evidence, that certain particular varieties of malformation of the *fœtus* are attributable, in some instances at least, to morbid conditions of the *placenta*, or of the membranes covering the internal surface of the *placenta*, as their immediate exciting cause;* that the not unfrequent occurrence of the death of the *fœtus* in the earlier as well as in the latter stages of pregnancy is almost always the result of a diseased state or states of this organ, and that the act of abortion, occasionally the indirect cause of that death, but much more commonly its indirect effect, is in very many instances capable of being traced to the same source. It does not seem, therefore, irrational to hope, that by a more careful investigation into the nature of the different diseased states to which the *placenta* is liable, and by a more diligent and rigorous observation of the symptoms that precede and accompany these states, and of the causes by which they are produced, we may be gradually led to a greater degree of facility and accuracy in their detection, and to the adoption of better established principles for their prevention and treatment,—and that in this way may be promoted in no inconsiderable degree, those great and ultimate objects of all medical study—the preservation of human life, and the alleviation of human suffering.

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* I ought perhaps to state, as exceptions to this general remark, a brief analysis of the symptoms of different diseases of the *placenta* from Professor Wilde's essay, inserted in p. 573 of the 6th volume of Dr Ryan's London Medical and Surgical Journal, as well as a short notice of the subject in Dr Ryan's own lectures on the Physical Education and Diseases of Infants, published in the same Journal, Vol. vi. p. 140–142.

The two most frequent and important diseased states to which the *placenta* is liable, *are certainly* sanguineous *Congestion* and *Inflammation*, with their various consequences. The placentary *parenchyma*, and the membranes investing the organ, are liable, as I shall afterwards endeavour to point out, to other morbid states—to hypertrophy and atrophy, to softening and induration, to cartilaginous and calcareous degeneration and the secretion or formation of other morbid products and tissues, to an anormal cystoid or hydatiform structure, and to various forms of malformation and displacement, but, in a practical point of view, most of these lesions are comparatively less important than congestion and inflammation, and the effects which these diseased conditions produce. It is to congestion and inflammation of the *placenta*, therefore, that I would wish first and principally to direct the attention of the Society.

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* The varieties of malformation to which I here more especially allude consist, as will appear in the sequel, of certain kinds of malformation resulting from a morbid adhesion between the embryo and the membranes covering the internal surface of the *placenta*. It is not improbable, I conceive, that other kinds of malformation may yet be traced to a diseased state of the appendages of the *ovum*, as their first or more immediate exciting cause, but the present state of our knowledge upon this subject is certainly not by any means such as can entitle us to assent to the following comprehensive proposition, deduced by M. Serres as the result of his able investigations into the origin of monstrosities with a reference to the theory of the primitive duality of all the organs of the body, and laid down by him in his late interesting work, "Recherches d'Anatomie Transcendante," &c. "En dernière analyse, la cause la plus generale des irregularités des developpement et de la monstruosité reside en premier lieu dans la dualité primitive des placenta, et en second lieu dans la separation, ou la coalescence de ces deux organes."—P. 178.

I.—CONGESTION OF THE PLACENTA.

By the term *Congestion of the Placenta*, I mean to express the existence of a greater than usual quantity of blood in the vessels of that organ, taking place rapidly or more slowly, in some cases rapidly or more slowly terminating in resolution, and in others leading to the infiltration or extravasation of blood in greater or less quantity or quantities, into the substance of the *placenta*, upon its uterine, or fœtal surfaces, or between the membranes of the *ovum*. The excess of blood in the vessels of the *placenta*, constituting congestion of that organ, may, there is every reason to believe, have its seat primitively and separately, either in the placental ramifications of the fœtal umbilical arteries and veins, or perhaps more frequently in the vascular prolongations, which seem to be extended from the uterine vessels of the mother into the substance of this viscus;* but a state of congestion in one of these systems of vessels, the foetal or the maternal, scarcely perhaps ever continues, for any considerable period of time, without giving rise to a similar state in the other.

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* In this and in other parts of the present essay, the language that I have employed, and some of the pathological explanations that I have offered, will be found to accord with the belief, that the description of the utero-placental vessels and circulation originally given by the Hunters is fundamentally correct, and that not only small tortuous blood-vessels (arterial branches) pass across from the inner surface of the *uterus* into the *placenta*, but that venous branches also, or hollow canals, at least, continuous with the venous sinuses of the *uterus*, run through the deciduous membrane, covering the uterine surface of the *placenta*. From what I have myself observed in recent *placentae*, and in a personal examination of Dr William Hunter's preparations in the Museum at Glasgow, I am inclined to believe that Dr Lee, and with him M. Velpeau and others, have deceived themselves in considering the placental *decidua* as an imperforated membrane, by not attending sufficiently to the circumstance, that the utero-placental veins pass through the deciduous covering of the *placenta* in a very oblique direction, and that the coats of these venous canals are extremely thin and slender, and composed of a tissue that is endowed with very little elasticity, and resembles in colour and appearance the proper tissue of the *decidua*. Hence it happens, that when we look upon the outer or convex surface of the *placenta* after it has been separated from the *uterus*, the deciduous covering of the organ presents the appearance of a perfectly continuous membrane, having no visible *foramina* or hollow canals in it, owing to the inelastic *parietes* of its venous canals having then completely collapsed together, and to the torn orifices of these canals, being thus concealed by their sides, more or less fully overlapping one another, in consequence of the oblique course of the vessels themselves. These sources of fallacy in ascertaining the proper vascular structure of the placental *decidua* are always rendered greater, if, instead of being kept of its natural convex form externally, the *placenta* be placed by us for examination upon a flat surface, as by this means all the parts on the uterine side of the organ are necessarily more closely pressed together. Drs Sharpey and Allen Thomson, in examining during last summer a gravid *uterus* taken from the body of a woman who had poisoned herself between the fourth and fifth month of pregnancy, were able to trace in the most satisfactory manner both utero-placental arteries and veins passing through the deciduous membrane of the *placenta*. They convinced themselves of the free communication of the venous canals which they found in the

Anatomical characters of Placental Congestion.—The anatomical characters of simple congestion of the *placenta* may, I believe, be sufficiently illustrated by a reference to the engorged and dark-coloured condition, which this organ presents, in cases in which the head of the child has happened to be long and dangerously impacted in the passages of the *pelvis.* The appearances which the *placenta* exhibits on its being expelled after such cases, and more particularly if the impaction has been so great as to prove fatal to the child, are well known to every practical accoucheur. The external surface of the organ is of a more or less deep-violet, and sometimes almost livid colour, its internal structure when torn or divided by the scalpel presents a deep purple hue, its vessels are everywhere loaded and distended with dark-coloured blood, the organ appears enlarged, and its substance feels heavier and more solid than natural.

In cases of abortion occurring as a consequence of physical injuries of the uterine region, or of any of those causes which give rise to it, by producing a strong determination of blood to the vessels of the *uterus*, the same congested and engorged state of the *placenta*, as that to which I have just now alluded, is generally met with, and in these instances also the blood is not unfrequently found effused in more or fewer points, from rupture of the lacerated or distended placental vessels, constituting the *Apoplexy* of the *Placenta* of M. Cruveilhier, who, along with Laennec, Andral, and other Parisian pathologists, has employed, of late years, this term to designate the existence of an effusion of blood into the tissue of the lungs, and other organs of the

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placental *decidua*, with the proper uterine veins or sinuses, by tracing a continuity of tube between these two sets of vessels, in carefully dissecting the venous canals or cavities of the *decidua*, both from the external or maternal portion of the substance of the *placenta* towards the *uterus*, and from the sinuses of the *uterus* towards the *placenta*, as well as by blowing air through them in these different directions while the preparation was immersed in water. These gentlemen discovered also small tortuous spiral arteries, less in diameter than the utero-placental arteries, but similar in form, passing from the inner surface of the *uterus* into the *decidua vera*, covering those parts of the *uterus* at which the *placenta* was not attached. They further found a net-work of considerable sized veins ramifying through the substance of this uterine *decidua*. The anastomosis of these deciduous venous canals with one another, as well as with the cavities of the veins running on the edge, at least of the placental *decidua*, and with the mouths of small venous orifices opening on the internal surface of the *uterus*, fully appeared on inflating them in different parts of their course. It is to be hoped that the results of this interesting observation, with all its necessary details, will soon be laid before the medical public. In addition I may state, that Mr Owen of London has been lately successful in verifying, by the careful dissection of several gravid *uteri*, the accuracy of the anatomical description of the utero-placental circulation left us by the Hunters.

body, while the word literally and originally signifies one of the more obvious external phenomena or symptoms only, which such an effusion of blood generally produces, when it happens to occur within the *encephalon.*[*]

The blood effused in placentary congestion and hemorrhage occurring during pregnancy may occupy different *anatomical situations.* In numerous instances it is found on the external surface of the *placenta*, or between it and the *uterus*, occasionally in very large quantity; in other instances the extravasated blood is situated towards the foetal surface of the organ, or insinuated between the membranes, or, as very often happens, between the *uterus* and *decidua*; and in others again, it is seen effused into the substance or proper structure of the *placenta*, as remarked by Deneux[†] and Baudelocque,[‡] and, as I have myself had an opportunity of observing, in a considerable number of specimens. In cases in which abortion occurs in the earlier periods of pregnancy, the extravasated blood is frequently found diffused over the whole or nearly the whole surface of the *chorion*, and between it and the *amnion*, in the form either of a continuous layer or layers of *coagulum*, or of more or less isolated nodules; and in two instances I have seen it occupying these situations, at the same time that it was both effused into the cavity of the *amnios* itself, and extravasated in the form of roundish masses among the rudimentary structure of the *placenta.* The immediate anatomical seat of sanguineous effusions situated in the substance of the *placenta* itself is probably in general in cavities formed in a greater or less degree by mechanical rupture of the tissues of the organ, but the occasional similarity of the form of the *coagula*, to the form presented by portions of wax injections thrown into the *placenta* by the utero-placental arteries or veins, would seem to show that in some cases the *coagula* are more or less completely circumscribed within the maternal cells of the *placenta*, supposing the description of these cells as given by the Hunters, Meckel, and Hildenbrand, to be correct. M. Deneux states, that, in the case already referred to, he found the effused blood partly situated in the interstices between the lobules or cotyledons, a circumstance which I have not had occasion to observe in any of the specimens of the disease that I have had an opportunity of examining.

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[*] Professor Thomson, in his lectures, has long been in the habit of employing the old term *ecchymosis* instead of *apoplexy*, to designate all morbid extravasations of blood into the tissues or structure of the internal organs of the body. This use of the term *ecchymosis* in medical pathology seems to be preferable to that of apoplexy, inasmuch as it is consonant both with the original derivation of the word, and with the signification in which it has long been employed by surgical writers. Dr Rush was, I believe, the first who in modern times set the example of applying the term apoplexy in the somewhat perverted signification to which I have above alluded. In his essay on Pulmonary Consumption, after stating different points of resemblance between the effusion of blood in the brain, and the effusion of blood in the lungs, he remarks, "From this great analogy between the remote and proximate causes of the two diseases, I have taken the liberty to call them both by the name of *apoplexy.*"—Medical Inquiries and Observations, Vol. ii. p. 53.

[†] Journal Generale de Medecine, Tome lxviii. p. 339.

[‡] Recueil Periodique de la Soc. de Medecine, Tome iii. p. 23.

The *particular vessel or set of vessels* which furnish the blood effused in placentary congestion, terminating in sanguineous extravasation, is liable to differ in different cases; but from the difficulty of accurately tracing the source of the hemorrhage in individual cases of the disease, I have little or no precise information to offer upon this point. When the hemorrhage takes place in the earlier weeks of pregnancy between the *chorion* and *decidua*, the blood probably escapes either from the new and tender decidual or umbilical vessels of the rudimentary *placenta*, or from both of these sets of vessels at the same time. When the blood is effused into the substance of the *placenta*, it is generally altogether impossible to trace the vessel or vessels from which it proceeds, and indeed the extravasation seems in many cases to occur at several different points at the same time. In a case detailed by MM. Grisolle and Caseaux, in the Revue Medicale for 1833,[*] and in which *coagula* of blood half an inch in thickness were situated towards the foetal surface of the *placenta*, some of the secondary divisions of the umbilical vessels would seem to have been ruptured. Occasionally the hemorrhage appears to proceed from a rupture more or less extensive of the vascular parenchymatous substance of the *placenta*. Thus Mr Wildsmith[†] mentions a case where, on inspecting the body of a woman who died during pregnancy, there was discovered a large *coagulum* at the anterior portion of the *fundus uteri*, weighing eighteen ounces, with a rupture of the *placenta*, two and a half inches in length. The blood in some instances, though originally poured out by vessels traversing the substance of the *placenta*, afterwards bursts through the tissues of that organ, and reaches its decidual or uterine surface, but in very many also of those cases in which the effused fluid occupies this latter situation, it may be traced to a direct rupture of the utero-placental vessels themselves.

The *quantity of blood* effused internally in placentary hemorrhage occurring during pregnancy is generally small, in most cases not exceeding a few drachms; but it is occasionally also, particularly when the blood is extravasated from the utero-placental vessels between the *placenta* and *uterus* in the latter stages of gestation, so great as to endanger or destroy the life of the mother. In some cases where the hemorrhage has thus proved fatal, the extravasated blood has been found to be wholly collected between the *uterus* and central portion of the *placenta*, and to be completely confined within this circumscribed situation, by the edges of the *placenta* preserving, around the whole circumference of the organ, their natural attachment to the internal uterine surface. Albinus has recorded a fatal hemorrhage of this description in his *Annotationes Academicae*;[*] and Delaforterie[†] and Saumarez[‡] have detailed similar cases. The quantity of blood effused between the *placenta* and *uterus* in the kind of circumscribed cavity above alluded to, is stated in M. Delaforterie's case to have measured three French chopins, and in Mr Saumarez's case it amounted to a pint and a-half. In these, and in similar instances of fatal placental or utero-placental hemorrhage occurring during gestation, death can scarcely be considered as an effect merely of the loss of the absolute quantity of blood effused. The attendant strong feeling of sickness and syncope, the paleness and coldness of the surface of the body, the state of the pulse, &c. would seem rather to indicate that the extravasated blood, by the sudden uterine distension to which it gives rise, or from other causes, produces a fatal depression of the action of the heart, similar to that which results from blows upon the *epigastrium* and severe injuries of the *abdomen*, and which we see supervening more slowly in cases of extensive *peritonitis* running on to a fatal termination.

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[*] See also the Dublin Journal of Med. and Chem. Science, Vol. v. p. 154.

[†] North of England Medical and Surgical Journal, Vol. i. p. 446.

The size or volume of the individual *coagula* or effusions of blood found in the substance of the *placenta* is liable to great variations. In some instances they are extremely small, not equalling a vetch seed in size; and again I find in my notes two cases mentioned, in one of which a single *coagulum* as large as a walnut is described; and in the other case, another *coagulum* is alluded to as equal in volume to a pigeon's egg. Wrisberg appears to have met with a placental sanguineous *coagulum* of a much larger size than either of these two.[§]

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[*] Parturienti placenta abscesserat, multo sanguine coagulato interjecto inter eam et uterum. Tota autem marginis circumferentia nihil quicquam abscesserat, eoque ne sanguis proflueret, prohibebatur. Quod quum non intelligeretur, mulierem interemit.—Annotat. Academ. Lib. i. Cap. x. p. 36. This *placenta* with the whole membranes of the ovum is represented in this author's *Uteri Mulieris Gravidae Tabulae*, Tab. vi.

[†] Journal Generale de Medecine, Tome xxix. p. 384.

[‡] New Medical and Physical Journal, Vol. vi. p. 535.

[§] In describing the *placenta* of an aborted *ovum*, Wrisberg remarks, "Media ejus pars exhibet magnum ovatae figurae corpus, ultra septem lineas supra reliquam eminens superficiem, coloris fusci nigri, instar coagulati sanguinis, omnem placentae latitudinem, 3½ poll. aequantem occupat, cum tota placentae longitudo 5¾ poll. sit. Maxi-

When in placentary hemorrhage or apoplexy, the blood is extravasated into the substance of the *placenta* itself, it most generally appears, as far as I have myself observed, under the form of roundish *coagula*, often accurately circumscribed; but in other cases, the form and outline of these *coagula* are altogether irregular, and the transition between the sound and diseased portions of *placenta* not very accurately marked. In some instances one or two *coagula* only are observed, or the extravasation is confined to one or two lobes or cotyledons only; but generally a considerable number of *coagula* are seen scattered throughout different parts of the same *placenta*, the sanguineous extravasation having occurred at several points, either simultaneously or successively. In one extreme case of this kind which I have met with, the section of a *placenta* of about the fourth month, presented throughout its whole structure only one agglomerated mass of distinct and separate roundish *coagula*, and the organ was increased so greatly in thickness by these interstitial effusions as to infringe very considerably upon the cavity of the *amnion*.

When hemorrhagic effusions take place towards the fœtal surface of the *placenta*, or in the earlier stages of pregnancy, between the *decidua* and *chorion*, the *coagula* of extravasated blood very frequently protrude these membranes before them, towards the cavity of the *amnion*, and appear in the form of projecting eminences or elevations on the amniotic surface. These eminences vary greatly in number and extent in different cases. In some instances almost every part of the amniotic cavity is crowded with them, in others they are seen only in that part which corresponds to the *placenta*. They vary from the size of a very small pea to that of a hazel-nut, or larger. Occasionally, they form very slight projections only above the general level of the surface of the *amnion*; generally they appear as rounded irregularly hemispherical eminences; and again I have seen them standing out from the walls of the amniotic cavity of an elongated nipple-like shape, and nearly as large as the first joint of the *thumb*. In several cases I have seen the umbilical cord, at its insertion into the *placenta*, at the same time greatly distended with coagulated blood, for a distance of six or eight lines, giving an appearance similar to that represented in two aborted *ova* figured by Albinus* and Sandifort. †

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ma prominentis hujus corporis latitudo 2 poll. 6 lin. invenitur. In ipso eminentiae centro, funis inseritur umbilicalis, cujus sanguifera vasa in magnos dividuntur ramos, &c."—Descriptio Anatomica Embryonis.—Sandifort's Thesaurus Dissertationum, Tome iii. p. 227.

* Academ. Annotat. Tom. i. Tab. v. Fig. 5.

† Observationes Anatomico-Pathologicae, Lib. iii. Tab. viii. Fig. 4.

The *substance of the placenta* more immediately surrounding recent hemorrhagic extravasations is occasionally darker red than natural, from imbibition or infiltration of the effused blood into the neighbouring portions of tissue, and sometimes the surrounding placentary structure is studded with a number of dark spots or points, probably originating in partial sanguineous extravasations, or in blood stagnated and coagulated in the cavities of some obstructed vessels.

Changes in the Blood effused.—In internal placentary hemorrhage or *ecchymosis*, the blood after its effusion undergoes a variety of changes, interesting in themselves, and important in this respect, that a misconception of their nature has, as it appears to me, led pathologists into error in regard to the nature of some of the lesions occasionally observed in this organ. When the blood is poured out from its containing vessels into the substance or cells of the *placenta*, or between the membranes, it gradually coagulates and assumes a very dark purple, and sometimes (as I have seen it in two preserved specimens[*]) almost a melanotic black colour. After a time, however, it begins to loose this tint, the colouring matter gradually becomes removed, and the *coagulum* successively assumes a chocolate brown, a reddish or brownish yellow hue, and latterly, if time sufficient is allowed, it presents a pale yellowish white or straw-coloured substance, the fibrinous, portion of the *coagulum* being then alone left. When these fibrinous and generally firm and indurated masses are divided, they for the most part exhibit internally a dense-like uniform or homogeneous tissue; but in some cases where the individual mass or *coagulum* has been formed by several successive effusions of blood occurring at the same point, and probably from the same vessel, its section shows a more or less perfect concentric laminated structure. M. Cruveilhier[†] has represented an *ecchymosed placenta* in which the structure of the *coagulum* appears to be concentrically laminated in this manner, and the more external layers are seen to be losing their colouring matter, while the *nucleus* of the effusion is composed of darker and more recently effused blood. I have not had an opportunity of observing these changes in specimens of laminated placental *coagula*, but have had repeated occasion to remark the discoloration of the more common single or homogeneous *coagula* proceeding from their circumference to their centre.

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[*] One of these specimens was in the rich and valuable pathological collection of Mr Langstaff of London, the other is contained in the Anatomical Museum of the University of Edinburgh. and is thus described in the printed catalogue (p. 236:) "*Placenta* about the fourth month; fœtal surface studded with numerous irregular dark-coloured tubercles resembling melanotic depositions." The dark appearance of the sanguineous *coagula* in both of these cases is such as might render them at first sight very liable to be confounded with actual melanotic deposits; and in the Edinburgh case this mistake in regard to their true pathological nature might have been the more readily committed, from the small masses of effused blood appearing of a beautiful bluish-black colour, as seen through the membranes covering the fœtal surface of the *placenta*, owing to these membranes, as semitransparent whitish media, reflecting the blue rays of light transmitted through them from the dark surfaces of the coagulated masses of blood lying immediately beneath them.

[†] Anatomie Pathol. Liv. xvi. Pl. i. fig. 1.

In the blood effused in placentary hemorrhage I have been able to trace a change still more advanced than that of its discoloration and conversion into a yellowish straw-coloured fibrinous mass. In four instances I have seen these fibrinous masses in different parts of the same *placenta*, contracted to a size considerably less than the space which they originally occupied, and consequently appearing, as it were, to be contained in cavities which were only but partially filled by them. This appearance is particularly well seen when the blood has been extravasated towards the fœtal surface of the *placenta*, or behind the *chorion* and *amnion*, and when it has protruded forwards these membranes in the form of the eminences or nipple-like projections, already alluded to. In such cases, after the colouring matter of the effused blood has been removed, and time is given for the fibrinous masses which are left to contract, the folds of the *chorion* and *amnion*, which they had carried before them, being inelastic membranes, remain in the position in which they were placed, and present themselves, when the *ovum* is afterwards examined, in the form of half-empty loose bags or sacks, projecting towards the cavity of the *amnion*. In one of the four *placentæ* in which I have observed this contraction, or diminution at least, of the fibrinous *coagula*, the cavities containing these contracted *coagula* were filled up with a limpid serum, but in the other three instances I do not find in my notes any mention of such an effusion.

In no case have I seen the complete removal of the fibrinous *coagula* from their containing cavities, or any appearance whatever indicative of the organization of these *coagula*; and I have to regret not having directed my attention particularly to the state of the placentary tissue more immediately surrounding the effusions, and observed the changes which take place in it upon the occurrence of these sanguineous extravasations. In some instances, as in those represented by Cruveilhier,* the surrounding placentary structure appears to become atrophied and anaemic, after the effusion has occurred; it seems probable, that, in other cases, this state and other diseased states of the placentary tissue and vessels may precede and indirectly give rise to effusions; but whether a cyst is ever formed around the sanguineous *coagula*, and under what circumstances it is formed, I have no data to determine, either from observations which I have myself made, or that I can find in the works of others.

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* Anatom. Pathologiq. Livr. xvi. Pl. i. Fig. 1 and 2, and Livr. vi. Pl. vi. Fig. 2.

I regret, further, not having in my possession any precise facts to determine the period of time which blood effused into the *placenta*, or between the membranes, requires to undergo the several changes that I have mentioned; but I have seen them all effected in diseased *ova*, which I had every reason to believe were expelled before the fifth and sixth month. The *placenta* that I have formerly alluded to as presenting cavities containing at the same time contracted fibrinous *coagula* and an effusion of serum, was expelled at the eighth month, but was less in breadth, though of much greater thickness, than *placentae* at that period generally are.

A number of the cases of *tumours* and circumscribed *indurations* of the placenta, described by Morgagni[*] in his 48th Letter, of the *scirrhous tubercles* mentioned by Albrecht,[†] and admitted by MM. Murat[‡] and Moreau,[§] and of those eminences on the surface of the *amnion* figured by Ruysch,[‖] Sandifort,[¶] Breschet,[**] Velpeau,[††] and Dr Granville,[‡‡] and spoken of by this last author under the name of *tuberculated ova* and *placentæ*, appear to consist in reality of *coagula* of blood, which have undergone more or fewer of the changes that I have attempted to describe. The white masses in the *placenta*, composed of a substance resembling both fat and cartilage, recently mentioned by Professor Stein,[§§] not improbably consisted also of the fibrinous matter of effused *coagula* of blood. In the notes which I took of the first specimen of these yellowish fibrinous masses which I had occasion to examine,[‖‖] I find that I have described them as internally "not unlike *tuberculous* or dense encephaloid matter;" but since that period I have had ample opportunities of correcting this conjecture, by an examination of above twenty additional specimens of this particular lesion, and I have now not only been able to trace in different *placentae* the gradual transformations already described as occurring in the effused blood, from its appearance as a recent dark-coloured *coagulum*, to its condition of a yellowish white fibrinous mass; but I have seen more than one instance in which these two states, with all their intermediate gradations of change and coloration, could be observed in different *coagula* which had been effused at successive periods in the same individual *placenta*.

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[*] De Sedibus et Causis Morb. Ep. 48, Art. 23, 24, &c.

[†] Acta Nat. Cur., Tom. iv. Obs. 104.

[‡] Diction. des Sciences Med. Tome xlii. p. 545.

[§] Archiv. General. de Medecine, Tome xxv. p. 124.

[‖] Thesaurus Anatomicus Sextus, Tab. ii. fig. 4, and Tab. iii. fig. 7.

[¶] Observationes Pathol. Lib. iii. Tab. viii. fig. 4.

[**] Etudes Anatomiques, &c. d'Oeuf, Pl. iv. fig. 3.

[††] Embryologie Humaine, Pl. ii. fig. 8 and 7.

[‡‡] On Menstruation and Abortion, Pl. vi. fig. 20.

[§§] Kleincrt's All. Repertorium, v. Jahr. 1 Heft. S. 35.

[‖‖] This specimen was contained, along with a second similar preparation, in the Museum of St Bartholomew's Hospital.

Sandifort seems to have been aware of the nature of some of the morbid appearances in the *placenta* and *ovum* that I have described, and to have observed some of the principal changes which the extravasated blood undergoes, as appears from the following passage in his Observat. Anat. Path. Lib. iii. Cap. vi. p. 95, "vasa disrupta effunderant, inter chorion et deciduam reflexam, sanguinem, que ibi in grumos collectus erat. Talis effusiosi contigit, ova depurari omnino nequeunt, etiamsi diutissime aqua contineatur, nisi decidua externa et reflexa a chorio penitus tollantur. Contra solvi, tolli, coagulatus ille sanguis valet, qui membranis extrinsecus adhaeret, efficit que, ut *ova, abortu rejecta, referant ferme semper massam cruentam, sic ut quadam veluti carne condentur, atque tunc nitidas puræque membranas omnes apparent.*" Vater, as quoted by A. C. Baudelocque (Traité des Hemorrhagies de l'Uterus, p. 57—58) mentions having seen an *ovum* like the one figured by Ruysch (Tab. iii. fig. 7,) and afterwards a second ovum with the coagula in a different state. "Eandem fere faciem (ut Ruyschii, fig. 3,) habebat ovum aliquando oblatum, sed mulierem morositate iterum ereptum, hac tamen differentiâ, quod eminentiæ interius occurrentes, non durae, sed vesiculæ sanguine grumoso plenæ fuerunt." (Dissert. Inaugural, Mola Prægnans, &c. p. 22.) M. Baudelocque describes an *ovum* which he had himself met with in 1823, having a number of small tumours in its coats, consisting, as his examination of them convinced him, of effusions of blood in different stages of alteration, "dans quelques tumeurs il n'yavait que la fibrine presque décolorée; dans d'autres la consistance du caillot etait moindre et sa couleur plus foncée." It appears to be this same specimen that M. Velpeau has figured, (Embryolog. Pl. ii. fig. 8). He briefly describes (p. 89) the "bousselures" upon it, as made up of "d'anciennes masses fibrineuses degenerées," and mentions having seen in 1833 one other similarly diseased *ovum*. M. Breschet states in reference to the case which he has figured, that he had not been able to determine the nature of the tumours seen projecting on its amniotic surface; "Oeuf humain que nous considerons comme offrant une alteration organique dont nous ne pouvons pas determiner la nature." (Etudes, &c. p. 156.) Dr Granville describes "the tubercles of *placentas*" as "formed by the enlargement of those filiform vessels which exist on the inside of the *chorion*." (On Abortion, p. 21.) I consider it only as an act of justice to myself, and, at the same time, as a strong corroboration of the accuracy of the pathological views which I have endeavoured to develope in the preceding pages, to state, that I had arrived at these views with regard to the various changes which the blood effused in placental *ecchymosis* undergoes, altogether from the examinations of diseased *ova* which had fallen in my way, and before I was in any degree acquainted with the cases and notices of it that had been previously published by Sandifort, Vater, Baudelocque, and Velpeau, in the different passages that I have just now quoted from their writings.

Having taken up so much of the time of the Society in describing the anatomical characters of placental congestion and hemorrhage, I shall be very brief in my remarks upon its causes and symptoms, referring on these subjects to the different treatises on abortion and uterine hemorrhage, and more particularly to the excellent work of M. Baudelocque upon this latter subject.*

Causes of Placental Congestion.—The occasional, exciting, or determining causes of placental congestion may be considered as existing either on the part of the child or of the mother.

With the causes existing on the part of the child we are as yet but very imperfectly acquainted; but it seems probable that all such morbid states and physical lesions and malformations of the fœtus and umbilical cord as have a tendency, directly or indirectly, to prevent or impede the free return of blood through the umbilical vein, will have the effect of producing more or less marked congestion in the minuter placental ramifications of this vessel, and perhaps may even lead in some cases, particularly if rapidly developed, to extravasations of blood from these ramifications. We now know that the *fœtus in utero* is liable to various febrile, contagious, malarious, and inflammatory affections, —to plague, small-pox, and perhaps measles and *scarlatina*,—to ague, and a number of acute internal inflammations, but whether the presence of these diseases in the fœtal economy is capable of exciting placental congestion or not through the long and tortuous tract of the umbilical arteries, and what morbid effects they may produce upon the placental circulation in general, are points still open for investigation.

As occasional, exciting or determining causes on the part of the mother, of placental congestion and sanguineous effusion into the substance and upon the surfaces of the *placenta* and *ovum*, I may mention physical injuries, such as blows, falls, &c. great muscular exertions,† and bodily fatigue, excess of venery,[*] morbid irritations of the *uterus* and neighbouring organs, acute febrile and inflammatory diseases, strong mental emotions, and, in general terms, all those circumstances which have a tendency to produce *plethora*, and increased action of the whole maternal vascular system, and of the uterine system in particular. These various causes may produce placental congestion and hemorrhage in different ways; certain of them, as the physical injuries alluded to, may occasionally lead to this effect, by directly or mechanically rupturing by the concussion which they create, some of the placental and utero-placental vessels and attachments; others of them, and even the very same causes at other times, may act by inducing a morbid determination of blood to the *uterus* and *placenta*, or by exciting such muscular contractions of the *uterus*, as will separate to a greater or less extent the mutual uterine and placental connections.

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* Traité des Hémorrhagies Internes de l'Uterus. Paris, 1831.

† Since writing the above, I find that M. Velpeau, in the last edition of his most elaborate "Traité de l'Art des Accouchements," is inclined to doubt if succussions of the body, blows upon the uterine region, falls, &c. are really capable of producing

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any mechanical detachment of the *placenta* from the surface of the *uterus*. "Quand on se rappelle que l'œuf remplit exactment l'uterus, qu'il est exactment rempli lui-même par l'eau de l'amnios, ou voit bientot que les mouvements imprimés a la femme par des secousses sont presqu' aussi incapables de separer le placenta de la matrice, ou le chorion de l'amnion, qu'ils le seraient d'isoler deux vessies emboitées l'une dans l'autre et dont l'interne serait completement rempli de liquide." Without discussing the point whether the *uterus* is always kept distended or not by its contents, in the manner here mentioned, a circumstance which appears to be extremely doubtful at least, (see Ingleby on Uterine Hemorrhage, p. 132, 133,) and perhaps liable to variations in connection with the relative state of fulness of the uterine vessels, or rather with the relative state of tension of the uterine walls, resulting from the condition of its blood-vessels, and without appealing to the abstract laws of physics in refutation of M. Velpeau's opinion, I would merely adduce for that purpose the morbid phenomena that are every day observed to take place within the *cranium*,—a cavity which we know for a certainty to be placed, after the *fontanelles* are closed, in the same physical relations with its investing membranes, and solid and fluid contents, as M. Velpeau conceives to subsist between the gravid *uterus*, and its contained *ovum*. Concussions and external injuries of the head are well known to produce occasionally a rupture of the blood-vessels running between the *cranium* and *dura mater*, and a greater or less consequent effusion of blood between their detached surfaces, without any depression whatever of the *cranium*. I have known a case of this kind, where a large circular *coagulum*, three inches in breadth, was found effused in this situation, on the body of a man who was discovered in the street during the night, in a state of profound coma. In other cases of traumatic apoplexy, we find blood effused on the cerebral side of the *dura mater*, between it and the arachnoid, or between the arachnoid and *pia mater*, and in other rarer instances, again, it is seen to be extravasated into the ventricles, or into the substance of the brain itself.

[*] In an interesting memoir on abortion among our domestic animals, inserted by M. Flandrin in Chabert's "Instructions et Observations sur les Maladies des Animaux Domestiques," Vol. vi. p. 107–164, it is stated that pregnant cows, mares, and sheep, miscarry in about twenty-four or thirty-six hours after sexual connection. The same effect is not observed in the sow. Entire flocks of cows are said to have been seen to abort with dead fœtuses after unusually violent thunder-storms, probably, it is conceived, in consequence of the terror that seems to be excited in the minds of these animals by such an occurrence. Occasionally, all the cows of a dairy, or even of a whole district of country, have been observed to miscarry one after another, a circumstance which some authors have endeavoured to explain on the principle of contagion. See Tessier, in "Memoires de la Societe de Medecine" for 1782–83, p. 549. Various curious notices on this interesting point in comparative pathology, are given by Mr Youatt, at p. 528–531 of his volume, on the Breeds, Management, and Diseases of Cattle, in the Library of Useful Knowledge.

With respect to the mode of action of general and local *plethora* and increased vascular action, in producing placental congestion and hemorrhage, I shall only venture to make one remark. If we admit with some authors, that the newly formed vascular canals, which, on the doctrine of the Hunters and others, are believed to pass from the uterine vessels into the *placenta*, are less firm and resistent in their coats or texture than the other blood-vessels in the maternal system, it will follow, that when a greater than usual *plethora* or vascular action happens to occur in the sanguiferous system of the mother, or when, from any causes, the blood is determined in a particular manner to the divisions of the uterine arteries and veins, it will be most apt to become congested in the naturally little, if at all, elastic vascular tubes and canals of the *placenta*; and further, if the momentum of the whole mass of blood in the body of the mother, or of that in the branches of the uterine vessels alone be preternaturally increased, the placental or utero-placental vessels or canals will be the first to yield or rupture under the generally or uniformly increased degree of internal pressure, inasmuch as they are the least capable of affording the requisite resistance to the distending force and equiversant pressure of the contained fluid. All the above effects will be naturally more or less promoted by the existence of any such diseased state or states of the tissue of the *placenta*, or of the placental and utero-placental vessels themselves, as diminish the elasticity and power of cohesion of the component tissues of these vessels, such as their stearoid, cartilaginous, or calcareous degeneration, &c.

Symptoms of Placental Congestion.—The symptoms produced by placental congestion and hemorrhage are, in many instances, obscure and difficultly appreciable, but in other cases, especially in those in which sanguineous extravasation occurs, the preceding and accompanying phenomena are frequently sufficiently characteristic and well-marked.

Simple placentary congestion, whether primitively seated in the fœtal or maternal vessels, seldom, perhaps, if ever exists for any considerable period of time, without more or less speedily superinducing a degree of uterine congestion; and again the state of congestion or determination of blood to the vessels of the *uterus*, when occurring as the primary pathological affection, is probably as generally and directly followed by a similar condition of the placental vascular system or systems. Placentary congestion, therefore, whether proceeding or not to extravasation of blood, usually appears to be either preceded or accompanied by those symptoms, which denote an increased activity in the uterine sanguiferous vessels, as by a feeling of oppression or weight, and tension or bearing-down in the uterine and pelvic *viscera.* If there exists a general plethoric state of the system, various febrile phenomena may also present themselves. Occasionally, the uneasy feelings in the uterine region proceed to a degree of fixed or intermittent pain, confined to one part of the *uterus* or uterine region only, or diffused generally over it. This pain seems frequently to extend to the loins and thighs, and a similar sensation appears in protracted cases to be sometimes even felt in the *mammae.* At the same time the morning sickness and vomiting, with the other sympathetic affections, which so frequently attend upon the natural developement of the *uterus* during pregnancy, are in most instances manifested in an increased or unusual degree.

When the placental congestion has proceeded to the extravasation of blood, besides the symptoms already mentioned, others of a more unequivocal character generally present themselves. The effused blood may, as we have already seen, be poured out in situations from which it cannot escape externally. Perhaps, however, in the earlier months at least, in the greater number of cases, some portion of the blood is effused into situations such that a small quantity of it does escape *per vaginam* ; and this circumstance, when found in connection with other symptoms, particularly with lumbar and uterine pains, and with the knowledge of the previous action of any of the directly exciting causes of placentary congestion or hemorrhage, may be considered as furnishing very unequivocal marks of the existence of these states. If a pregnant woman, for instance, immediately after receiving a fall or blow, or any sudden succussion of the body, such as that occasioned by severe coughing or retching, be seized with sudden distensive uterine pain, and more or less effusion of blood externally, little doubt can, in most cases, be entertained, with regard to the nature of the internal morbid conditions which these symptoms indicate. One of these symptoms only, however, the uterine, or lumbar pain, or the external hemorrhage, may alone be present. The feeling of uterine pain, if occurring alone, can perhaps be but little trusted to as a diagnostic mark in the state of pregnancy, unless when taken into consideration with various collateral circumstances. In placental hemorrhage it is probably produced, as M. Baudelocque has supposed, by the mechanical distension of the *uterus* with the blood effused, and this distension can, it has been alleged, be sometimes (though I should conceive very rarely) actually traced externally in the enlargement of the absolute volume or bulk of the *uterus.* In some instances the pains remit or disappear entirely in the course of a few days or weeks, when the uterine enlargement has again proceeded considerably in its course, and in many other instances they pass sooner or later into the intermittent and regular pains indicative of uterine contraction. The external hemorrhage, is, in some instances, observed to be in considerable abundance from the beginning; but more frequently it presents itself, in the first instance, as a few drops of blood, or of blood and serum only, afterwards becoming increased or not in quantity. In many cases this hemorrhage is seen to remit and return repeatedly, after the lapse of a few days, or at the distance of several weeks.

When placental hemorrhage occurs in the latter months of pregnancy, the internal effusion of blood is sometimes so great, particularly when proceeding from a rupture of the utero-placental vessels, as rapidly to produce all the most alarming symptoms caused by extreme loss of blood, and under such circumstances the case may even proceed to a fatal termination, without, as I have already mentioned, any sanguineous discharge whatever appearing externally. In other cases of placental congestion and hemorrhage occurring in advanced pregnancy, there is an external discharge as well as an internal effusion of blood; although no part of the *placenta* is found on examination to be placed over the *os uteri*,—a case which I have not included, and consequently avoided all allusion to, in the preceding observations.

Effects of Placental Congestion on the Fœtus.—When placentary congestion occurs after the period of quickening, and is very acute in its character, or rapid in its appearance, the motions of the *fœtus* would appear to be occasionally rendered suddenly irregular, and at times almost convulsive. If the congestion is more chronic in its nature, the motions of the *fœtus* occasionally become extremely languid, or not at all appreciable; but under a timely detraction of blood, they may be, as Madame Lachapélle* has remarked, again reproduced after having ceased for several days. How much we may be assisted in the latter months of pregnancy by auscultation, in this and in similar cases, in our detection of the morbid states of the placental and fœtal circulations, it is difficult, if not impossible, at this moment to determine; but more accurate and extensive observations upon this subject may yet lead to some not unimportant results.

The occurrence of sanguineous effusion from the placental, utero-placental, or exposed mouths of the uterine vessels, though often in the latter, and almost always in the early months of utero-gestation, unattended with any great danger to the mother, and very frequently making no impression whatever upon her system, or not even betraying itself by any external discharge, must always be looked upon as a circumstance threatening the most direct and imminent danger to the life of the *fœtus*, for a very small quantity of blood, whether extravasated in the earlier weeks upon the villous surface of the *chorion*, or at a later period into or around the *placenta*, may be amply sufficient to arrest the processes of fœtal nutrition or respiration to such a degree, as effectually to impede the developement, or destroy the life of the embryo, and in this latter way prove an indirect cause of abortion. For my own part, I feel assured that the preparations of aborted *ova*, contained in the pathological museums of this country, fully bear out, as far as I have myself seen them, the opinion of Professor Duges,* that the most frequent cause of abortion is active placental congestion, a term under which he at the same time includes placental hemorrhage. This remark, I believe, will be found in particular to apply to abortion in the earlier months. In the greater proportion of cases which I have met with of *ova* aborted in consequence of internal placental hemorrhage, I have found the *ovum* itself of the average size of an orange, and the embryo arrested at about the fifth or sixth week of developement, or at that stage at which the extremities of the body first begin to appear in the form of rounded buddings. Expulsive uterine contractions had not, however, supervened in many of these cases for several weeks after the internal sanguineous effusion had actually taken place, and in some of them, the general growth of the membranes and *placenta* appeared to have gone on during that interval, while in one or two cases the embryo itself had also enlarged to nearly the size of the thumb, although the individual developement of its extremities, and perhaps of other organs, had been arrested.

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* Pratique des Accouchments, Tome ii. p. 323.

INFLAMMATION OF THE PLACENTA.

The next series of Morbid Conditions of the *Placenta* to which I have to direct the attention of the Society, consists of *Inflammation and its various consequences.* It is only within these few years, that the state of inflammation has been distinctly recognized by pathologists, as a morbid action liable to present itself in the *placenta*, and though much of the pathological and nosological history of the disease certainly still remains to be made out, yet I believe a considerable stock of interesting information may even at the present moment be colleeted in regard to it, by taking a generalized view of the different scattered cases and notices of the affection, which have been published by Brachet in his original memoir on this affection, and by Cruveilhier, D'Outrepont, Dance, Stratford, and other authors.

Placentitis, or Inflammation of the *Placenta*, would appear to be in some cases acute, in others chronic, in its character and progress, most frequently perhaps the latter. It may have its seat either in the proper *parenchyma* of the organ, in the membranes investing its fœtal, or in that investing its uterine surface, or in two or all of these parts at the same time. When seated in the *parenchyma* of the *placenta*, or on its uterine surface, it would seem to be in some cases strictly limited to one lobe or cotyledon of the organ; in other cases it coexists in two or more isolated and even distant lobes; but more frequently it appears to attack simultaneously or successively several adjacent lobes, and in this way it may come to involve a third, the half, or even the whole extent of the *viscus*. In a considerable proportion of instances of *Placentitis*, the inflammatory action seems to be originally propagated from the adjoining substance of the *uterus* to the *placenta*, the first symptoms being those usually considered as characteristic of *Metritis*, but in other instances the inflammation appears to originate in, and to be strictly confined to, the tissue of the *placenta* itself or its membranes, without spreading to the substance of the contiguous portion of *uterus*; and in other cases, again, there is every reason to believe, that, though originating in the *placenta*, the inflammation may spread from it to the *uterus*. The occasional primary origin of inflammation in the substance of the *placenta* itself seems to be fully proved by various considerations,—by its sometimes appearing only in one lobe, or in several circumscribed distant and isolated parts of the *viscus* at the same time,—by its attacking one *placenta*, only in cases of twins or triplets,—and by its being occasionally strictly confined in its seat to the fœtal surface or side of the organ alone.

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* Diction. de Medecine et Chirurg. Tome viii. p. 309.

Anatomical Characters of Placentitis.—The modes in which placentary inflammation terminates, and the morbid lesions and products to which it gives rise, differ greatly in different cases, according to the more or less acute or chronic character of the inflammatory action, the particular seat which it occupies, and other circumstances connected with it. In arranging the observations to be made upon the morbid anatomical characters of the disease, I shall divide it into three stages, the first including the stage of inflammatory congestion, and effusion or secretion of serous fluid; the second that of the effusion or secretion of fibrin or coagulable lymph; and the third that of the secretion or effusion of purulent matter.

First Stage.—In the *first stage* of placental inflammation, or that of *Inflammatory Congestion*, the *placenta* is larger in volume, and darker in colour, than natural, owing to the unusual accumulation or engorgement of blood in its vessels; it feels comparatively denser or more solid to the touch, and as it approaches the second stage, an effusion of serum, or of serum and coagulable lymph, occurs, and the tissue of the organ becomes more lacerable under the pressure of the finger.

It would be extremely difficult, if not impossible, (if we may judge from the analogy of the lungs and other organs,) to distinguish, by any specific anatomical characters, between the sanguineous engorgement of the *placenta*, which constitutes the first stage of inflammation, and that active non-inflammatory form of placental congestion which I have already endeavoured to describe. Indeed it is highly probable that the non-inflammatory congestion or engorgement occasionally passes into that which is inflammatory, and yet they would appear to be two morbid states intrinsically distinct from one another, and differing widely in the morbid effects and products to which they give rise. The non-inflammatory congestion will perhaps be found almost always generally diffused over the whole *placenta*, while the congestion of inflammation is often confined to a number of particular lobes only ; the former leads to an extravasation of blood, and sometimes of serum,—effusions purely the result of mechanical over-distension of the vessels; the latter, again, gives rise to the various morbid products which are observed to result from inflammatory action in other organs of the body, and which are not mechanical extravasations, but vital, though morbid, secretions. In any individual case, however, of the first stage of placental inflammation, and of congestion, it is often difficult, and not unfrequently impossible, to determine its true nature, from the mere anatomical character of sanguineous engorgement of the organ alone, and frequently it is only when we find this state of the placentary mass combined with other more decisive proofs of the action of inflammation,—as with softening of the substance of the organ, with effusion of turbid serum, of coagulable lymph, or of pus, that we can decidedly pronounce upon its actually inflammatory character.

Second Stage.—The *second stage of Placentitis* I have already stated, as characterized by the inflammatory action having proceeded to the effusion or secretion of coagulable lymph. The morbid appearances and effects produced by this second stage of the disease vary greatly, according as the effused coagulable lymph is deposited, 1*st*, in the interstitial or *parenchymatous* substance of the *placenta*, or is effused, 2*d*, upon its uterine, or 3*d*, upon its fœtal surfaces.

1. Few well-marked or accurately detailed cases of *acute* Placental Inflammation, producing an effusion of coagulable lymph into the parenchymatous texture of the organ, have as yet been put upon record. From the morbid appearances, however, observed by Brachet,[*] D'Outrepont,[†] and others, in a few cases of

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[*] Loc. cit. Obs. 1. p. 11.

[†] Gemein. Deutsche Zeitschrift, Band v. Heft. 4 s. 556.

Placentitis, referable to this stage, and from what I have myself observed in a recent specimen of this form of the disease, the following, I believe, may be deduced as its principal characteristic anatomical characters. The affected part of the organ is of a more or less deep red-colour; its texture when cut into, is found solid and dense, and resembling in consistence and appearance a portion of healthy liver, or of pulmonary structure affected with red hepatization. It is inelastic to the touch, but though increased in compactness and solidity, it is still in general so friable, particularly when the inflammation is acute or recent, as to be readily lacerated or ruptured under any considerable pressure. It generally contains more or less of a brownish or reddish turbid liquid, which exudes from its incised surfaces under gentle pressure, or when these surfaces are scraped with the back of the scalpel.

But the form under which we most frequently meet with the deposition of coagulable lymph into the parenchymatous structure of the *placenta*, is that of reddish and grayish yellow *Induration*, the effect, I believe, of *chronic* inflammatory action. This morbid state of the *placenta* has been long known to accoucheurs, and has generally been described by them, along with some other morbid states of the organ, to be afterwards mentioned, under the name of *scirrhus of the placenta*. It evidently, however, has no pathological relations with scirrhus, at least in the sense in which that term is used at the present day, as designating a carcinomatous state or degeneration of an organ. Chronic induration of the *placenta* occurs in cases in which we have no evidence of the presence of the carcinomatous *diathesis*, in the coexistence or subsequent occurrence of scirrhous disease in any of the other organs of the bodies, either of the mother or of the infant,—it has never been remarked in any instance, (so far at least as I am aware,) to ulcerate or fungate, or take on any of the usual malignant action of scirrhous degenerations,—and the anatomical characters which the indurated *placenta* exhibits, differ from those which are usually considered as characteristic of true scirrhus.

On the other hand, that Induration of the *Placenta* is the result of chronic inflammatory action, and the deposition of coagulable lymph, seems proved by the consideration of the nature of the morbific causes by which it is produced, (generally blows, falls, and such external injuries as are calculated to give rise to inflammatory action, received several weeks or even months previously to the expulsion of the indurated organ,)—and by the fact, that it is sometimes possible in different *placentæ*, or even, as I have seen, in different parts of the same *placenta*, to trace the gradations between the increased solidity of *acute hepatiza-*

ion, and that of the most advanced and best marked variety of *chronic induration.*

The anatomical characters of Induration of the *Placenta* appear to vary considerably in different cases, according to the extent of the disease, and the more or less chronic character of the inflammatory action which produces it. In most cases the indurated part is of a reddish or pink-gray hue, but sometimes, probably in its more advanced stages, it presents a citrine yellowish colour. Its section sometimes exhibits a uniform, very compact, and occasionally a somewhat stearoid, lardaceous, or fatty-looking structure; it contains little or no fluid, and in some instances has a dry and desiccated appearance, approaches the density of cartilage, and emits when cut a creaking sound. It very often affects only one lobe, or two or more contiguous, or distant lobes, and in other instances it implicates the whole or nearly the whole of the placentary mass. The portion or portions of *placenta* affected with chronic inflammatory induration, is occasionally found united by adhesive inflammation to the adjoining portion of *uterus*, in whole or in part; but in other instances no such adhesive action has occurred, and indeed the disease may be limited altogether to the fœtal side or surface of the *placenta.*

2. The effusion or secretion, however, of coagulable lymph, as a termination of placentary inflammation, is best known in the effect to which it not unfrequently gives rise, of producing more or less intimate and extensive *Adhesion* between the uterine surface of the *placenta* and the inner corresponding surface of the *uterus*, constituting a morbid state of the after-birth that frequently forms a most formidable and dangerous cause of uterine hemorrhage after the expulsion of the child.

The *extent* of the morbid adhesion of the *placenta* to the *uterus*,—the *seat* of the adherent portion,—and the *strength* or *intimacy* of the adhesion, are found to be liable to great variations in different cases.—In a few rare instances the whole or almost the whole of the organ is found intimately connected with the internal surface of the *uterus*, but far more frequently the adhesion is limited to a single lobe, or to a few adjoining lobes. The adherent lobes are occasionally those *seated* in the centre of the *placenta*, and in other cases those placed at the circumference of the organ only. I may refer to Dr Ramsbotham's* third case, as an instance of the former, and I shall afterwards have particular occasion to notice a remarkable example of the latter observed by Dr Hamilton. †

Occasionally when the *placenta* is only partially adherent to the internal surface of the *uterus*, the unadherent portion is brought away after the expulsion of the child, by traction at the cord, or by the introduction of the hand, while that which is morbidly adherent is still left more or less firmly attached to the internal surface of the *uterus*. Dr Ramsbotham * has described a series of instances of this kind, under the title of *disruption* of the *placenta*; and Mr Ingleby, † in his able work on Uterine Hemorrhage, has referred to several fatal cases and *post mortem* inspections in which a similar accident had occurred. In one of these *post mortem* inspections, where the woman had died the eleventh day after delivery, a number of pieces of *placenta* were found still firmly adherent to the *fundus uteri*. In a second case, where death had occurred twenty or twenty-one days after delivery, many small masses of *placenta* in a black and offensive state were seen studding the internal surface of the *fundus* and part of the body of the *uterus*; these masses did not separate by maceration. In a third case, a portion of *placenta*, about the size of a small egg, was attached very firmly to the *fundus* of the *uterus*, and could not be separated either by the finger or by maceration. The patient had died of irritative fever on the thirteenth day after delivery. In a fourth case, where the patient sunk on the eleventh day after delivery, Mr Ingleby found a layer of *placenta*, covered with a thin purulent-looking fluid, nearly circular, and three inches in diameter, very fibrous and rather white in appearance, adhering somewhat tenaciously to the *fundus*. In a fifth case, he found, five weeks after delivery, a portion of *placenta* about the size of a walnut, attached to the *fundus* of the *uterus*. The retained portion of *placenta* had apparently acquired or retained a degree of organization; it was of a somewhat florid colour, the lining membrane of the *uterus* covered the greater portion of the mass, though not its centre, which was ragged, and vessels could be traced opening upon it.

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* Practical Observations in Midwifery, Part i. p. 99.

† Practical Observations on various Subjects relating to Midwifery, 1836. Part i. p. 286.

Dr Biancini ‡ in a lecture on the connection between the blood of the mother and *fœtus*, published at Pisa in 1833, mentions a case similar to the above. A woman who had suffered greatly during parturition died eight days after delivery. The attempts made to bring away the *placenta* had occasioned a profuse and alarming hemorrhage. After death an injection of glue and vermilion thrown into the uterine vessels filled all the uterine arteries, and penetrated into the vessels of a considerable portion of *placenta*, which was still adherent.

The *intimacy or strength* of the morbid adhesions between the

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* Practical Observations, p. 164. seqq.

† On Uterine Hemorrhage, p. 205, seqq.

‡ Sul Commercio Sanguigno tra la Madre et il Feto. 4to Esperimento.

placenta and *uterus* is liable to vary greatly according to the degree of acuteness of the inflammatory action which has originally produced the effusion of coagulable lymph, and the length of time it has been deposited. When the coagulable lymph, on which the adhesion depends, is soft and recent, and the effect of acute inflammation, the degree of adhesion between the *uterus* and *placenta* is scarcely greater than natural. If, however, the inflammation be more chronic, and the deposition of coagulable lymph has become organized, the *placenta* is with greater or less difficulty separated from the *uterus*, by the uterine contractions, or by the hand of the accoucheur. In some instances the organic union between them is so firm, and the corresponding surfaces of the *uterus* and *placenta* are so intimately blended together, that the uterine contractions are altogether inadequate to break up the morbid organic connections existing between them; and occasionally it has been found impossible to disunite them completely from one another by any manual efforts during life, or even by dissection after death.

The *thickness* of the layer of coagulable lymph uniting the *placenta* to the *uterus*, in cases of morbid adhesion between their contiguous surfaces, is sometimes very considerable. Wrisberg* mentions a case of very strong, and apparently universal adhesion of the *placenta*, in which he found the uterine surface of the organ covered with a membranous substance, two lines and a-half thick in the intervals between the lobes, and from a line and a-half to two lines in thickness, where it covered the surface of the cotyledons. In this and similar cases, is the coagulable lymph effused, at first, into the substance of the placental decidua, causing its morbid thickening; or is it principally thrown out upon the uterine or upon the fœtal side of that membrane, and are the cavities of the decidual utero-placental vessels liable to become obstructed with it? Is the inflammatory effusion of lymph producing the morbid adhesion of the *placenta* to the *uterus* furnished by the decidual or decidual and proper placental vessels, or is it chiefly thrown out by the vessels of the adjoining portion of the internal surface of the *uterus*, or are not all of these vessels generally the seat of inflammation, and the sources of the effusion at the same time, owing to the inflammatory action, when it originates in any of them, in most instances speedily spreading by contiguity of texture from the one to the other? Occasionally the coagulable lymph effused between the *placenta* and *uterus* is changed not only into a filamentous or cellular morbid structure, but, as happens also in the false membrane of chronic pleuritis, it sometimes assumes a tendinous or cartilaginous appearance. Thus Wrisberg states, that, in the case above referred to, the thick membrane covering the *placenta* was whitish, compact, and very dense, and of a cellular or rather tendinous structure, (albicante, compactâ et durissima, cellulosa quasi tendinea.) This membrane, forming the bond of union between the adherent *placenta* and *uterus*, may also, as we shall afterwards find, be the seat of calcareous deposits, &c.

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* Commentat. Medic. Obstetric. &c. Argumenti, p. 45.

Cases such as I have alluded to above, in which the morbid union between the *placenta* and *uterus* is so intimate as not to permit of the two organs being readily separated by the hand, or by the scalpel even upon the dead body, are certainly of rare occurrence. Saltzmann[*] however, Plater,[†] and Morgagni,[‡] may, from among others, be cited, as having recorded striking examples of it. In Saltzmann's case the woman had died immediately after delivery, and on opening the body, he found "secundinam undiquaque ipsi utero tam firmiter adhaerentem ut vix et nonnisi labore separari potest." Plater describes the *placenta* as so adherent to the *uterus* on the dead body of a woman who had sunk under similar circumstances, "ut aegre manibus avelleretur, et tracta laceraretur." The case recorded by Morgagni is one of still greater interest. The subject of it, a woman who had during the course of pregnancy been lifting very heavy weights, suffered a premature labour at the seventh or eighth month, and died, with the *placenta* almost wholly retained, on the eleventh day after delivery. On the *post mortem* inspection of the body part of the *placenta* was found detached, and hanging down through the *os uteri*, but another portion of it was still so strongly adherent to the *uterus*, that it scarcely could be separated from it even with the aid of the scalpel, (utero dicte adeo affigebatur, ut vix posset, cultri etiam ope, separari.) The adherent portion of the *placenta* was indurated, and the corresponding surface of the *uterus* inflamed.

Of late years several cases have been published in Germany by Professor Naegele [§] of Heidelberg, and by Drs Salomon [‖] and Burger,[¶] in England by Dr Rigby,[**] in France by M. Gabillot,[††] and in America by Mr Porcher,[‡‡] in which adherent and retained *placentæ* have been supposed to be either totally absorbed from the *uterus*, or to have become organically and permanently incorporated with its substance. Madame Boivin,[*] has endeavoured to explain away the cases given by Drs Naegele and Salomon, by supposing, that in those instances where the *placentæ* had been conceived to be retained, they had actually passed off, but escaped observation, from their consisting of a merely membranous structure, or being otherwise malformed. Granting that this explanation may bear upon some of the cases that have been published, it certainly, I think, cannot be made to apply to others; and without at all questioning the good faith or powers of observation of those who have given the cases hitherto recorded, the question may at present be permitted to remain *sub judice*, until more decided evidence is brought forward either in its favour or against it, and in particular until an opportunity occurs in which an *uterus* can be examined in which this supposed process of placental absorption is actually going on, an important link in the chain of evidence, but one that, as far as I know, is still wanting.

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[*] Observat. p. 43. Bonetus' Sepulcretum Anatomicum, Tom iii. p. 121.

[†] Observat. Lib. i. p. 231. Bonet. Sepul. loc. cit. p. 121.

[‡] De Sedibus et Causis Morbor. Epist. xlviii. Art. 28.

[§] Froriep's Notizen. Bibliotheque Medicale (1829) Tome i. p. 366.

[‖] Kleinert's Allgemein. Report. vi. Jahrgang. 2. Heft. s. 72.

[¶] Rust's Magazin für Gesam. Heilkunde, Bd. xxxv. s. 156.

[**] London Medical Gazette, Vol. xiv. p. 333.

[††] La Clinique. 29th August 1829.

[‡‡] American Journal of the Medical Sciences, No. xx. p. 391.

Various pathologists seem inclined to reject at once the idea of the absorption of the *placenta*, upon the assumed ground, that it is altogether impossible that the uterine absorbent vessels could ever remove so large and solid a mass as that of which the human *placenta* is composed. If the facts, however, upon which such an objection could be alone legitimately founded are more carefully examined, they will, I fear, be found to weigh, so far as they have been hitherto observed, as much, at least, in favour of the question at issue as against it. Dr Salomon has adduced various instances from Bartholin (*De Insolitis Partûs Humani Viis*, page 37;) Carus (Zur Lehre von Schwangerschaft und Geburt-Erste. Abtheil. 1822, s. 2, 50;) and Huzard (Memoires de l'Institut. National des Sciences et Arts, Tome ii. Scien. Mathem. et Physiq.) of what appear to be accurately observed cases of the removal from the *uterus* of the cow of the soft parts of the fœtal calf, nothing having been found in the uterine cavity after death except a mass of fœtal bones. This occurrence seems to take place after the full term of pregnancy has been completed, and when the *uterus* has been unable to rid itself of its contents, in consequence of some obstacle in the *pelvis*, or otherwise, to the passage of the calf. Cases of this kind are, I believe, not extremely rare. I have myself had two instances reported to me, by persons upon whose powers of observation I can implicitly rely, of the *uteri* of cows containing a mass of fœtal bones. Mr King has recorded a similar case in the "Veterinarian" for January 1834. Jaeger (Meckel's Archives für Anat. und Physiologie, Bd. xi. s. 91,) mentions having discovered a *fœtus* reduced to a skeleton alone, in the *uterus* of a deer. In extra-uterine pregnancy in the human subject, the *fœtus* has been occasionally discharged by the intestinal canal through the abdominal *parietes*, or through the cavity of the urinary bladder or *vagina*, in the form of loose bones. In these cases are the soft parts of the body of the *fœtus* and its *placenta* always, by a suppurative or other morbid action, decomposed and diffused through the fluid contents of the extra-uterine cyst, and afterwards discharged externally, previously to or along with the fœtal bones? In the case of the cow, does a similar process of decomposition and discharge of the soft parts take place while the bones are retained *in utero?*—or are the soft parts and appendages of the *fœtus* ever removed in either of these two sets of cases from the cavities containing them by a process of absorption? I am not aware of any facts observed with a requisite degree of accuracy from which to deduce any decided answer to these questions, but they appear to me to be subjects that deserve to be minutely and carefully attended to in the observation of future similar cases; and if, in any sufficient number of instances, it can be proved that the *uterus* of the cow is actually capable of removing, by an act of absorption, the soft parts and appendages of a contained *fœtus*, as is supposed by Salomon, and admitted also, I believe, by Carus and Huzard,—or if by a similar process the *placenta* and soft parts of a human *fœtus* can be removed from an extra-uterine cyst, it would certainly seem unreasonable to reject altogether the idea of the absorption of a morbidly adherent human *placenta*, upon the sole ground that an absorbent action, of the degree or extent required for that purpose, could not possibly go on at the internal uterine surface. When an extra-uterine *fœtus* becomes encrusted with calcareous matter, and is retained for a long period in the body of the mother, its *placenta* appears to be sometimes either removed or changed in such a manner that it cannot be recognized. In the case, for example, recorded by Dr Cheston (Medico-Chirurgical Transactions, Vol. v.) and where the *fœtus* was supposed to occupy the cavity of the *uterus* itself, it is stated (p. 231,) that no remains of the membranes, *placenta*, or navel-string could be discovered, except the insertion of the last into the body of the child.

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[*] Observations et Reflexions sur les Cas d'Absorption du Placenta, Paris, 1829.

3. The fœtal as well as the uterine surface of the *placenta*, or at least the membranes covering the fœtal surface of the organ, are also liable to be the seat of the inflammatory secretion of coagulable lymph, or, in other words, of adhesive inflammation. M. Cruveilhier has mentioned a case in his Anatomie Pathologique, Livr. xvi. where the placental surface of the chorion was penetrated with false membrane, the cellular tissue between the chorion and amnion likewise infiltrated, and the *placenta* itself enlarged and *œdematous*, or containing a considerable effusion

of serum. Mr Stratford of Boston has also detailed the particulars of an interesting case of absorption at the third month of utero-gestation, where the *placenta* was large, soft, and spongy, and covered with *flocculi* of coagulable lymph, particularly on its fœtal surface. The membranes of the *ovum* appeared to be thicker and more opaque than natural, and yellow *flocculi* of coagulable lymph were floating in the *liquor amnii.*

I have seen more than one instance in which the amnios covering the *placenta,* and other parts of the surface of the membranes, were partially coated by an effusion of coagulable lymph, and M. Mercier, * in his papers on dropsy of the amnios, has alluded to the same morbid appearance. I shall presently have occasion to allude, when speaking of the effects of *Placentitis* upon the *fœtus,* to a series of interesting cases, in which the internal surface of the *placenta* has been found intimately attached by adhesive inflammation to the head and *abdomen* of the child, and has seemed in consequence to act as a cause of some varieties of malformation.

Third Stage.—The third stage of *Placentitis* (according to the division previouly proposed) consists in the effusion or secretion of purulent matter. The purulent matter secreted in placentary inflammation has now been found occupying several different situations, and deposited under different forms. In one case mentioned by M. Brachet † he found two circumscribed abscesses, each as large as a pigeon's egg, situated beneath the fœtal surface of the *placenta ;* these deposits were circumscribed in their locality, although no distinct cysts isolated them from the surrounding placentary tissue. In another *placenta,* M. Brachet ‡ found an abscess occupying three-fourths of the extent of the organ, protruding towards its fœtal surface, and containing as much as a wine-glassful of purulent matter mixed with blood; and in a third case § he observed a number of little abscesses, varying from the size of a small pea to that of a nut, scattered throughout the substance of the *placenta,* and surrounded by hepatized structure. Cruveilhier || seems to have met in several instances with concrete purulent matter, infiltrated through the tissue of the *placenta,* accompanied by an effusion of coagulable lymph between the portions of chorion and amnion, investing the fœtal surface of the organ, and surrounding its circumferance. In these cases the texture of the *placenta* was denser than usual, much less vas-

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* Journal Generale de Med. xlv. p. 256, &c.

† Loc. cit. Obs. v. p. 22.

‡ Ibidem, p. 23.

§ Loc. cit. Obs. vi. p. 25.

|| Anat. Pathol. Liv. i. and Revue Medicale, 1830, Tome ii. p. 410.

cular, of a somewhat lardaceous appearance, and as it were toughened and indurated.

The deposition of purulent matter on the uterine surface of the *placenta* is mentioned by the late M. Dance [*] in an interesting case of fatal vomiting and inanition during the early months of pregnancy. Between the *placenta* and *uterus* there was a layer of concrete *pus* which could be lifted up by the back of the scalpel, in the form of yellowish *flocculi*, and whitish-pseudo-membranous concretions existed between the *membrana decidua* and the internal surface of the *uterus*. M. Breschet[†] in his essay on the human *ovum*, states that he had met with two analogous cases of purulent and pseudo-membranous effusions between the *placenta* and *uterus*, and over the surface of the *membrana decidua*, the substance of this membrane being at the same time thickened and infiltrated with purulent matter. In a memoir on diseases of the *uterus*, inserted by M. Dance in the Archives Generales for October 1829,[‡] he has described a case of abortion preceded by febrile and inflammatory symptoms, and where there was a layer of soft coagulable lymph and purulent matter deposited, not, as in the preceding instances, on the uterine, but on the fœtal surface of the *placenta*, between its *chorion* and *amnion*; the placental portion of the *chorion* was at the same time opaque and greatly thickened.

Before concluding the description of the anatomical characters and effects of placentitis, it is almost unnecessary for me to remark, that in the same *placenta* two or all the different stages of inflammation are very often found coexisting together in different cotyledons and surfaces of the organ, or even in the same cotyledon and surface; and that every shade and transition may be occasionally observed in an inflamed portion of the *viscus*, from congestion to the effusion of coagulable lymph and of purulent matter, either in an acute or chronic form. In proof of this remark, I may merely refer to the instances of the disease that I have last quoted, and to 1st, 5th, and 6th cases of it reported in M. Brachet's Memoir.

In most of the cases of placentary inflammation hitherto published, the disease has only been recognized at the time of delivery, and neither the causes which gave rise to it, nor the symptoms which it had produced, have in general been accurately traced. Very limited data, therefore, it must be allowed, exist with regard to these parts of the history of *Placentitis*. These data, however, so far as they go, are not without interest or practical importance; and in order, if not to arrive at, at least to approximate to, as accurate a degree of information as they are calculated to afford, I have selected twenty of the recorded cases of the disease, from among others given in the writings of Ramsbotham, Brachet, Dance, Stratford, and D'Outrepont, for the purpose of comparing and analyzing their phenomena with particular reference to the points I have mentioned. In making the selection of these twenty examples of *Placentitis*, I have acted solely on the principle of uniformly rejecting all those cases of the disease to which no kind of commemorative history was attached, and which, consequently, could be of no use for the purpose at present in view, while I have as uniformly retained all those other instances of the affection that had any commemorative history connected with them; and I only regret that, in a considerable number of these cases, this history is so imperfectly given as to furnish little or almost no precise information.[*]

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[*] Repertoire Generale d'Anatomie, Tome iii. p. 71.

[†] Etudes Anatomiques, &c. Sur l'Oeuf, dans l'Espece Humaine, p. 123–4.

[‡] Archives General. de Medecine, Tome xxi. p. 222.

Causes of Placentitis.—With respect, however, to the *exciting causes* of placentary inflammation, I may, in the *first* place, mention that M. Brachet enumerates as such, blows upon the belly, falls, violent succussions, sudden and great movements, frights, emotions, all kinds of lively and profound sensations, and diseases of the mother, particularly *metritis* and other inflammatory complaints. In turning to the individual cases given by M. Brachet, I find that in two instances (cases 10, 16,) the disease seems to have come on, while the mother was suffering under great mental anxiety;—in a third case the only assignable exciting cause was a severe fright which the mother had experienced ten days previously to the abortion, at the fourth month of pregnancy, of a *fœtus*, the *placenta* of which was in the first stage of inflammation ; and in a fourth instance, the mind of the patient had been kept harassed during the whole period of pregnancy with domestic quarrels. In two other of M. Brachet's cases (12, 13,) as well as in two cases of adherent *placentæ*, mentioned by Dr Ramsbotham, (1, 8,) the inflammatory action was apparently produced by falls. In one of Dr Ramsbotham's cases, (7,) the affection was attributed to carrying a heavy basket against the side during pregnancy, and in the instance of acute *Placentitis*, given by D'Outrepont,* (20) too tight lacing, with a view to conceal pregnancy, appears to have acted as the exciting cause. In two of Dr Ramsbotham's cases of adherent *placenta*, (2, 5,) the inflammatory action productive of the adhesion seems to have been excited by blows upon the *abdomen*. In one of these cases, (5,) where the blow was received upon the fore part of the *abdomen*, the *placenta* is afterwards mentioned in the history of the delivery as firmly united to the fore part or corresponding portion of the interior surface of the *uterus*. I refer to this case the more, that Saxtorph and Wenzel† state that the *placenta* when attached to the anterior wall of the *uterus* is frequently morbidly adherent—a circumstance that D'Outrepont ‡ says is consonant with his own experience, and one, I conceive, for which we may perhaps account by supposing, that the organ, when occupying this situation, will be more exposed to the physical injuries already alluded to as capable of giving rise to *placentitis*, either directly or indirectly, by exciting, in the first instance, inflammatory action in the contiguous or corresponding portion of the uterine *parietes*. Of the remaining eight cases of *placentitis* upon the list, no allusion is made to any exciting cause of the disease in the history of five of the cases, (3, 4, 6, 17, 18,) and in the remaining three instances (9, 14, 19,) it appears that no exciting cause could be traced, although inquiry was made after it.

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[*] The following note contains a list of these twenty cases. In order to facilitate the references that are made in the text to the cases individually, I shall affix a particular numeral to each, and at the same time state, for the sake of the greater precision, the kind of inflammatory lesion which the *placenta* exhibited.

Ramsbotham, Practical Observations, Part 1. Case 1, (p. 94); 2, (p. 106); 3, (p. 108); 4, (p. 109); 5, (p, 122); 6, (p. 125); 7, (p. 129): 8, (p. 131); 9, (p. 179). All instances of adherent *placentæ;* in case 2 the membranes were likewise singularly adherent.

Brachet, Journal Gener. de Medecine, Tome cii. Case 10 (p. 13), extensive chronic inflammatory induration; 11, (p. 15), the half of the *plucenta* in a state of acute and inflammatory congestion; 12, (p. 20), chronic inflammation; 13, (p. 22), two abcesses on the fœtal side of the *placenta;* 14, (p. 23), a very large abscess on the fœtal side of the organ, with surrounding hepatization; 15, (p. 25), effusion of coagulable lymph and pus at many points throughout the placental *parenchyma;* 16, (p. 33), uterine surface of the *placenta* adherent.

Dance, Repertoire Generale d'Anatomie, &c. Tome iii. Case 17, (p. 71), an effusion of coagulable lymph and purulent matter between the *uterus* and *placenta* and over the external surface of the *decidua vera.* Archives Generales de Medecine, Tome xxi. case 18, (p. 222), an effusion of pus and coagulable lymph between the placental *chorion* and *amnion.*

Stratford, London Medical and Surgical Journal (1829) Vol. ii. Case 19 (p. 89) inflammation of *placenta* and membranes of the *ovum*, with effusion of coagulable lymph.

D'Outerpont, Gemein. Deutsche Zeitsch. fur Geburt. Bd. v. Hft. 4. Case 20, (p. 556), acute inflammatory hepatization.

Among the predisposing, if not among the exciting causes of placentary inflammation may, I believe, be justly enumerated the existence of the same state of disease in a previous pregnancy. It is well known that morbid adherence of the *placenta* to the *uterus* is occasionally met with in several successive pregnancies in the same woman. Dr Hamilton states in his "Practical Observations,"§ that he has known several mothers of large families, who had, in the course of their child-bearing life, incurred three or four or even five times, great danger from this circumstance. Mauriceau mentions two cases, in one[*] of which abortion had occurred either four or five times, and in the other[†] five times in succession, between the sixth and seventh months of pregnancy, and without any evident exciting cause. The infants appeared to have died some days before their expulsion, and the *placentæ* of all of them are stated to have been scirrhous, or affected with chronic inflammatory induration, generally throughout almost their whole extent. In one of M. Brachet's patients, (case 14,) abscesses were found in the *placenta* of two consecutive pregnancies, and this case is the more remarkable, that the placentary inflammation in the *first* instance was evidently the consequence of a fall, while, as I have stated above, no exciting cause for the disease could be traced to account for the disease in the subsequent pregnancy. In connection with these facts, I may here, at the same time, mention that other forms of placental disease besides inflammation show the same tendency to recurrence in different pregnancies in the same individual. The tendency to the repetition of abortion in women who have once suffered from it, is a fact which the practical accoucheur has constantly occasion to observe, and numerous striking examples of the great frequency of its repetition in the same woman have been put upon record.[‡] In many of these cases of recurrent abortion, the affection appears to be connected either with placentary congestion or inflammation. Dr Gooch,[§] in the second volume of his "Chirurgical Works," has recorded an instance where the *placenta* was found ossified to a greater or less extent in the same patient three several times; and Bonus[||] observed a case of a similar triple recurrence of the hydatiginous condition of the *placenta* or *chorion*.

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* Gesammelt. Schrift. ii. s. 359.

† Gemein. Deutsche Zeit. für Geburt. Bd. v. Hf. 4. p. 556.

‡ Kleinert's Allgemein. Repert. loc. cit. s. 82.

§ Practical Observations on various subjects relating to Midwifery, p. 286–7.

It would be interesting, and in some respects practically important, to ascertain the duration of the different stages of *placentitis*, or, in other words, the variety of morbid lesion which the organ might be most apt to present to us, according to the distance of time that may, in any given case, have elapsed, between the application of the exciting cause of the disease, and the ultimate expulsion of the organ from the *uterus*. But the twenty cases which I have above noted afford very little satisfactory information relative to this point. I find that in nine only out of the twenty cases are any data mentioned, by which the time between the application of the probable exciting cause of the *placentitis* and the time of delivery can be ascertained with sufficient accuracy. In one of these cases (11,) where the disease appeared to be of ten days' duration, the half of the *placenta* was affected with the first stage of inflammation; in a second (19,) in which the symptoms had lasted for 13 days, there was an effusion of coagulable lymph and purulent matter between the placental chorion and decidua; in a third case (6,) of three weeks' duration, there were adhesions between the *uterus* and *placenta* that were capable of being easily separated; in a fourth case (5,) the adhesions between the *uterus* and *placenta* were rather strong, although the disease was only apparently of a month's duration; in a fifth case (13,) in which two abscesses were found in the *placenta*, the first symptoms of the disease had occurred after a fall about seven weeks previously; in two other cases (1, 16,) there were chronic adhesions with the uterine surface, and in one of these cases (16,) the adhesions are described as very strong, the affection having lasted for several months; and in the two remaining instances (10, 12,) where chronic induration of the *placenta* was found, the *Placentitis* seems to have continued in one case (10,) for four and a-half months, and in the other (12,) for two months.

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[*] Observations sur la Grossesse et l'Accouchement. Obs. 283, p. 235.

[†] Ibid. Obs. 141, p. 198.

[‡] In Plouquet's Literatura Medica, Tom. i. p. 8, a number of references may be found to the works of authors that have mentioned examples of the frequent recurrence of abortion.

[§] Cases and Practical Remarks in Surgery, Vol. ii. p. 250.

[||] Mad. Boivin, Sur la Mole Vesiculaire, p. 24.

Symptoms of Placentitis.—The *symptoms* accompanying *Placentitis* must necessarily be considerably varied, by its more or less acute or chronic character, by the extent and seat of the inflammatory action, and particularly by its happening to be complicated or not with inflammation of the contiguous portion of the parietes of the *uterus*. When we consider the frequent chronic nature of placentary inflammation, its apparent occasional confinement strictly to the substance of the *placenta*, and the fact that though nerves have been alleged to have been found in the umbilical cord and *placenta* itself, none have hitherto been distinctly shown to pass between it and the *uterus*, or, in other words, between the *placenta* and the mother, we may be disposed rather to wonder at *Placentitis* giving rise so generally to symptoms more or less marked in the maternal system, than that the disease should sometimes be latent in its character.

The symptom which seems most constantly to accompany placentary inflammation is *pain* or pains fixed to the uterine or lumbar regions, or to some part of these regions, and differing in different cases in intensity, character, and duration.

Pain in the uterine and lumbar regions has been observed in almost all those cases of *Placentitis*, the history of which has been traced with any degree of care. But this symptom, it must be confessed, may present itself also during pregnancy, as an effect of other pathological states of the *uterus* or its contents, besides placental inflammation; and, again, it appears to have been wanting in some instances in which this disease actually existed. When the full histories, however, of individual cases of *Placentitis* shall come to be more patiently and accurately investigated, such exceptional cases will probably diminish greatly in number. In the meantime I may only observe, that in estimating the value of this symptom as a pathognomonic mark of placentary inflammation, we must not reject it as an uncertain one, (as many British accoucheurs seem inclined to do,) from the fact of its occasionally occurring, in a well-marked degree, during a greater or less part of utero-gestation, in cases in which the *placenta* is ascertained at the time of delivery not to be morbidly adherent; for we must recollect that this adhesion of the *placenta* to the *uterus* is only *one* of the various morbid effects or lesions to which *Placentitis* gives rise; and in many such cases as those to which I allude, if the *placenta* itself be carefully examined after its expulsion, one or more of these lesions will generally be detected in its substance, or in its membranes.

When after the action of any of the exciting causes of *Placentitis*, which I have previously enumerated, a local lumbar or uterine pain supervenes, we may, as M. Brachet has stated, in general presume with considerable confidence upon the presence of placentary inflammation: and here, it appears to me, we should in some cases be able to make an useful practical application of uterine auscultation in the diagnosis of this disease; for if we find the seat of pain to correspond with the seat of the placental soufflet, the certainty of the connection of that pain with placental inflammation will necessarily be greatly increased. I make this remark on the supposition that Monod, Kennedy, and Paul Dubois are correct in referring the sound in question solely, or in its greatest degree of intensity at least, to the seat of the attachment of the *placenta* to the *uterus*, if not to the utero-placental vessels themselves.

In endeavouring to ascertain the exact seat of the local pain in any given case, more caution is required than seems to be generally believed. On this subject I cannot, I believe, do better than copy the just remarks and judicious injunctions given by Dr Ramsbotham.* "We frequently meet," he observes, "with great vagueness in the description of pain, and particularly in the description of the situation of that pain, and, if anything like precision be desirable, the patient should be requested to lay her hand on the part. A woman will tell you she has got a pain at her heart, and if you apply this test of the situation of the pain, she probably applies the hand to the epigastric region, or to any part but that over the heart. If she complain of a pain in the side, she probably applies the hand to the side of the belly; but even this test will not be sufficient to enable a professional man to discriminate between a pain in the *parietes* of the belly, and one situated in the *uterus* or in the parts underneath. If he wish to arrive at any degree of accuracy in this respect he must examine the part with his own hand. The apparent indelicacy of this act must give way to the patient's welfare."

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* Practical Observations, p. 77.

On consulting the histories of the twenty cases of *placentitis* that I have previously enumerated, I find that pain in the region of the *uterus* or loins was complained of in seventeen; in one of the remaining three cases (14) the sensation amounted only to a feeling of dragging (*tiraillments*) in the lumbar region; in another (4) the patient is merely described as having been out of health for two months previously to delivery; and in the third (18) it is distinctly mentioned that no local uterine pain was ever complained of. Of the seventeen cases in which uterine or lumbar pain was present, in two (5, 7,) the particular seat of the pain is not specified; in two (11 and 13,) it is described as existing both in the *uterus* and loins; in five, (10, 12, 15, 16, and 17,) it seems to have been felt only or principally in the lumbar region, and in the last (17) of these five cases it extended down from this region along the thighs. In another case (19) the pain in the loins was accompanied by a strong bearing-down sensation in the uterine reigion; and in seven cases, (1, 2, 3, 6, 8, 9, and 10,) it appears to have been entirely confined to some part of the uterine tumour. Out of these seven cases in which the pain was seated in some part of the *uterus* alone, in three (8, 9, 20,) it is mentioned as having been seated towards one side of that organ; in one (1,) as felt between the *umbilicus* and *pubis;* and in three (2, 3, 6,) it was felt in the region of the *umbilicus* or the fore-part of the uterine tumour.

The character of the pain is described in three cases, (6, 9, 20,) as constant; in one (1) as almost constant; in another (7) as at first remittent, and afterwards constant; and in six as remittent, (1, 5, 10, 12, 13, 15.) Of the six cases in which it was remittent, in one (13) it was increased by leaving the horizontal posture; in two, (1, 5,) it was increased during the night, and in one of these two, (1,) the part which was the seat of the pain, (viz. the lower and anterior part of the uterine tumour,) was tender to the touch, but the pain itself was not rendered greater by motion. In one (3) of the instances in which the pain was confined to the fore part of the *uterus*, the patient appears to have found relief in lying upon her belly and face in bed. In most of the above cases the particular nature of the pain is not mentioned, but in others it is variously described, as dull, heavy, burning, obscure, &c.

In the greater number of the cases, the pain supervened within a few hours, or at most within two or three days after the application of one or other of the exciting causes already mentioned, and generally continued more or less from that period to the end of utero-gestation. In one case (10) the pain was relieved, and in two others, (12, 16,) removed by the detraction of blood.

In one of the cases (18) recorded by M. Dance, already particularly alluded to as not accompanied by uterine pain, there was most obstinate vomiting for three months, defying all remedies, and at last producing death, apparently by inanition, between the third and fourth month of pregnancy; and in the two instances previously referred to as met with by M. Breschet, * in which anatomical pathological appearances were found similar to those in this case of M. Dance's, a similar state also of frequent, obstinate, and very violent vomiting accompanied the disease. In M. Dance's case, though the uterine surface of the *placenta* was extensively inflamed, yet the *fœtus* did not appear to have suffered, and it seems probable, therefore, that the placentary inflammation only supervened towards the last days of life, at the same time, perhaps, that the slight attendant febrile symptoms first appeared. In two of the acute cases of *Placentitis*, (17, 19,) mentioned by Stratford and Dance, shivering with febrile symptoms supervened in the course of the disease; and in one of the instances, (12,) given by Brachet, febrile symptoms came on along with lumbar pains on the night after the patient was exposed to the injury, which apparently acted as the exciting cause of the placentary inflammation.

In several instances of suppurative inflammation of the *placenta* alluded to by Cruveilhier, he appears to have observed as a very uniform symptom, a kind of continued hectic febrile movement, with an exacerbation in the evening, preceded or not by shivering. Dr Burns † describes a species of fever which he has observed to affect women about the middle period of pregnancy, and that appears to be not unlike in its principal characters to the disease described by M. Cruveilhier: he states, that this affection makes its attacks suddenly like a regular paroxysm of ague; that it soon puts on rather an appearance of hectic; and on the whole, he conceives, it bears a great analogy to the infantile remittent fever. This disease, Dr Burns adds, is very obstinate, and often ends in abortion. Has not the *placenta* in such cases been the seat of inflammatory action?

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* Etudes &c. de l'Oeuf, p. 124.

† Principles of Midwifery, (1832,) p. 224.

Professor Wilde * mentions also slight fever and great heat, as common symptoms of placental inflammation, and when this inflammation happens to terminate in suppuration, he describes a dragging sensation and shiverings as supervening, with dull heavy pains in the *uterus* and thighs, that are more especially felt on standing or walking. The same author states, that in Placentitis the urine is sometimes passed in drops, and with a sharp pain, and that when the disease runs on to induration or hepatization, the dull local uterine pains are occasionally accompanied by a white, irritating, and abundant discharge from the *vagina*. In Mr Stratford's case (16) a discharge of blood from the *vagina* appears for a short time to have preceded the expulsion of the diseased *ovum*; and Mauriceau † mentions in the details of one of his cases of recurrent abortion from indurated *placenta*, which I have formerly alluded to, that a small quantity of blood was usually voided *per vaginam*, for ten or fifteen days previously to the labour-pains coming on. In M. Dance's first case (17) the aortic pulsations were unusually strong, a symptom that may perhaps be pointed out as affording, in most instances in which it occurs, an indication of increased or inflammatory action in the extremities of the vessels more immediately arising from that artery.

In considering the different symptoms of Placentitis that I have had occasion to mention in the preceding pages, it is difficult, and, indeed, in the present state of our knowledge, altogether impossible, to estimate justly what degree and variety of these symptoms ought to be attributed to the placentary inflammation itself, and how much the character and combinations of them are liable to be varied by that inflammation of the adjoining internal surface and *parietes* of the *uterus*, by which the Placentitis is often accompanied and complicated. In order to arrive at anything approaching to accurate information upon this point, a much greater number of carefully observed facts than at present exist on the records of medicine, will be required. But I may here observe, that, out of the twenty cases of inflammation of the *placenta* previously enumerated, in two of the instances, (13, 19,) in which the disease appears to have been principally confined to the fœtal surface of that organ, the characteristic pains were well-marked, and even severe, while in the only case (18) in which this local pain was entirely absent, the inflammatory action was seated on the uterine surface of the *placenta* and membranes, and the tissue of the *uterus* itself was, on *post mortem* inspection, found to be softened. The local pain, also, seems almost always to cease after the process of labour and the expulsion of the diseased *placenta*. In one case, (16,) however, the region of the *pubis* continued tender for some time after delivery.

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* Ryan's Medical and Surgical Journal, Vol. vi. p. 573.

† Observations sur la Grossesse, Ob. 283. p. 233.

Morbid Adherence between the *placenta* and *uterus*, the result of adhesive inflammation between their contiguous surfaces, besides being accompanied by more or fewer of the above-mentioned symptoms during pregnancy, is almost uniformly marked, at the time of delivery, by a more or less profuse and sudden flow or gush of blood attending upon each recurrence of uterine pain or contraction after the birth of the child, and even sometimes also during the act of its expulsion. The exceptions to this general rule, more especially to the occurrence of hemorrhage with each after-pain, as long as the *placenta* is allowed to remain adherent, are very rare. In instances, however, such as those met with by Wrisberg,* Desmoreaux,† and Ramsbotham,‡ of apparently universal adhesion of the *placenta*, no hemorrhage can be expected, and Dr Hamilton § has recorded an example of another form of morbid adhesion, where no hemorrhage took place after delivery to indicate the diseased state of the after-birth; in this instance the central portion of the *placenta* was healthy, but around its whole border or circumference the organ for the breadth of an inch was morbidly and firmly adherent to the *uterus*.

Danger of Placentitis to the Mother.—The morbid inflammatory adhesion of the *placenta* to the *uterus*, just now alluded to, is not unfrequently attended with great danger to the mother at the time of delivery, or subsequently to that event, from the extreme hemorrhage to which it sometimes gives rise, from its leading, under unskilful management, to inversion of the *uterus*, or afterwards from its retention producing, as it so frequently does, a very fatal form of irritative fever. As illustrative of the frequency, and, at the same time, of the danger liable to result to the mother from this consequence of placentary inflammation, I may remark, that, from the annual reports of the Royal Maternity Charity of London, in the years 1828–29–30 and 31, published by Dr Francis Ramsbotham, in the 3d, 5th, 7th, and

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* Comment. Med. Physiol. Anat. et Obstetr. Argum. Tom. i. p. 44.
† Dictionnaire de Medecine, Tome vi. p. 420.
‡ Practical Observations, p. 82.
§ Practical Observations. Part i. 286.

9th volumes of the Medical Gazette, it appears that during the above period, 8967 women were delivered in the district of the Charity which is under Dr Ramsbotham's more immediate care. Out of these 8967 cases, there were 67, or nearly one in every 134, in which the *placenta* required the introduction of the hand for it is removal, either on account of its being morbidly adherent to the *uterus*, or from its being retained by the atony or irregular contractions of this organ; * 45 out of the 8967 women delivered, or nearly one out of every 199 died, and 13 out of these 45 deaths, or about one-third and a-half of the whole, were directly attributable to the effects resulting from morbid adhesion of the *placenta*;—in other words, one woman out of every 689 that were delivered perished in consequence of this single consequence or termination of placentary inflammation.

But besides the fatality occasioned by this single termination of placental inflammation subsequently to the expulsion of the child, inflammation of this organ sometimes proves a source of danger to the mother during the progress of pregnancy, by producing in her a state of general bad health, or by giving rise to abortion or premature labour.

Thus out of the twenty cases of placental inflammation, to which I have so frequently adverted, abortion occurred in one (17) at the third month, in a second (18) between the third and fourth, in a third (19) at the fourth, in two (11, 18,) at the sixth, and premature delivery in one (20) at the eighth, and in another (13) at the eight and a half month of utero-gestation. In several of the remaining cases, the time of utero-gestation at which labour came on is not mentioned, but in most of them the placental inflammation was of a subacute or chronic character, and the patient seems generally to have gone on to the full period of pregnancy, and even it is stated in two cases (10, 14,) some days beyond that period. From the former cases, however, and from all that I have observed, I am convinced that placentary inflammation will be found to be a much more frequent cause of abortion and of ill health to the mother during pregnancy, than seems at present to be at all suspected. It is known as a general observation among obstetrical practitioners that, in cases of abortion, the *placenta* is not unfrequently retained in the *uterus* for days or even for weeks after the *fœtus* is expelled. Does this retention depend in some of these instances upon inflammation having taken place in the *placenta*, or in the contiguous surface of the *uterus*, and produced a morbid degree of adhesion between these two organs?

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* It does not appear from Dr Ramsbotham's tables in how many out of these 67 cases the *placenta* was actually retained by morbid adhesions with the *uterus*, and in what proportion other causes acted in producing that result. I have not been able to find any sufficiently extensive series of obstetrical observations, by which to judge of the usual average number of cases in which the *placenta* becomes morbidly adherent to the *uterus*, but I am inclined to think that the ratio given in Dr Ramsbotham's tables is considerably higher than usual, owing probably to the patients applying to the Dispensary belonging to a rank of life in which they are exposed to many of the exciting causes of placentary inflammation. Adhesion of the *placenta* to the *uterus* being only *one* of the effects of *placentitis*, and commonly of *placentitis* in a chronic form, it would be impossible to judge from the frequency of utero-placental adhesion alone of the frequency of placentary inflammation in general.

Effects of Placentitis on the Fœtus.—Placentary inflammation occasionally proves fatal to the *fœtus in utero.* Professor Wilde, in his brief enumeration of the symptoms of this disease, mentions as one, that the motions of the child gradually become weaker, and at last cease altogether, a circumstance observed in two of M. Brachet's cases (10, 14,) and in those previously quoted from Mauriceau. (Obs. 241 and 283.) Out of the eight cases of placental inflammation given by M. Brachet, in one (16) the state of the infant is not adverted to; in three the children were dead born, viz. in the two cases (10, 14,) to which I have just alluded; and in a third instance of twins * one child was dead and beginning to putrify, and the whole substance of the *placenta* corresponding to it was in the second stage of inflammation. The second child and *placenta* were healthy. Of the other four cases of *Placentitis* mentioned by Brachet, in one (11) the child was lively but died thirty hours after birth, and in all the other three, (12, 13, 15,) the infants were feeble and excessively pale, wan, and lean; one of them died in a few days after birth; the other two survived.

The *placenta* being apparently directly subservient both to the respiration and nutrition of the foetus, performing for it at once the functions of the lungs and of the stomach, or perhaps more properly of the mouth, during the greater part of its intra-uterine life, it is not wonderful that chronic inflammatory disease of this organ, by more or less completely arresting or impeding the performance of these functions, should sometimes destroy the life of the child, and in other instances produce in it that state of *phthisical marasmus*, (if we may so term it,) which the three infants, mentioned by M. Brachet, exhibited. That the state of these infants was really dependent, not upon any pathological condition in their own economy, but only upon the morbid condition of the *placenta*, and the mal-performance of its functions, was proved, on the one hand, by no anormal or morbid lesion being discovered upon a careful *post mortem* inspection in two of the fatal cases, and, on the other hand, by two of those infants that were born alive rapidly gaining plumpness and strength, when transferred to the care of a good nurse. The above were instances in which the inflammation of the *placenta* had been chronic, and the disorganization it produced consequently slow in its progress, and more or less of the organ had been left in a state fit to perform its functions. Where the inflammatory action is more acute in its nature, or more general in its extent, the foetus may be killed by it more rapidly, and before its state of nourishment is affected. This appears to have happened in M. Brachet's fifth case (13,) where at the 8½ month of utero-gestation, the child was born dead and putrid, but of large size and sufficient weight. Three-fourths of the *placenta*, as I have already stated, were occupied by a large abscess, which the history of the case shows to have been of comparatively recent formation.

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* Journal General. cii. p. 11, 12.

There is one other series of effects produced by placentary inflammation, or at least, by inflammation of the membranes covering the external surface of the placenta upon the fœtus, which I regret that the already too extended limits of this essay will allow me merely to allude to,—I mean the morbid connection of the internal surface of this organ, by adhesive inflammation with some part of the body of the *fœtus*, and the production, in consequence of that connection, of different forms of malformation by displacement and arrestment of developement, in more or fewer of the fœtal viscera and members.

Paul Portal, in his work on the Practice of Midwifery,[*] has given the first, and among the older authors, the only distinct instance which I have been able to find of this variety of monstrosity;[†] but since the beginning of the present century, eight cases at least have been published by different authors, of malformed fœtuses born with the fœtal surface of the *placenta* more or less intimately connected by morbid adhesions with their head and face. The first of these cases was published by Dr Poole[*] of London, the second Mr Cam[†] of Bath, the third by Necati,[‡] a fourth, first recorded by Duchateau,[§] and afterwards minutely and ably described by Geoffroy St Hilaire,[||] a fifth by Breschet,[¶] three by Charles Rudolphi,[**] and the last and eighth by Lauray.[††] Besides these nine published cases, I may mention, that I have myself had an opportunity of examining three additional specimens of this curious species of monstrosity, one in the Museum of Guy's Hospital, a second in that of the London University, and a third in the anatomical collection belonging to the London College of Physicians.

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[*] La Pratique des Accouchemens, p. 192–199, 1685. Two figures of the child and *placenta* are given.

[†] Dr Thomson has pointed out to me an instance of monstrosity figured in the Ephemer. Nat. Curios. for 1673, p. 166, by Lachmund, as in all probability an example of the morbid attachment of the *placenta* to the head of the child, but the description given of the case is very indistinct. In the works of the older writers on monstrosities, as in those of Lycosthenes, Licetus, Aldrovandi, &c. I have not found any instance of malformation, in which it is distinctly stated that the *placenta* was connected by morbid adhesions to the *fœtus* in the manner mentioned in the text, but it is probable that some of the instances of torn membranes, occasionally described by these authors as attached to the heads of malformed infants, and fancifully supposed by them to resemble the ears of the lower animals, &c., were the remains of ruptured placentary adhesions. An instance of monstrosity quoted from Fincelins by the younger Schenkius, (see his *Monstrorum Historia Memorabilis*, 1609, p. 8–9,) was perhaps an example of the attachment of the *placenta* to the head of the *fœtus*. " Habuit ille in vertice *massam carnis*, *imaginem praebens testudinis rufae*; in cervice caudam carnosam habuit instar muris, sed abescentem, qualis erat cutis sine pilis, capite erat Thersitico, oculis extantibus."

Within these few years several other cases have been put upon record of malformed *fœtuses* born with the *placenta* adhering either directly or by means of a connecting membrane to the *parietes* of the unclosed abdomen of the *fœtus*, or to its extroverted abdominal *viscera*. Dr Poole,[‡‡] in the short paper already referred to, mentions having seem a case of this kind; Mr Hill[§§] has recorded what appears to be a second similar instance; in 1817, a third was shown to the Society of Medicine by Chaussier;[||||] and three additional cases have been more lately described by Dr Knox,[¶¶] Professor Henot,[***] and Dr Montgomery.[†††] Of this variety of malformation and morbid placental adhesion, I have seen five instances,—two of them in the London University Museum, one in the Museum of Dr Blundell, another in that of Mr Langstaff, and the fifth in the collection of M. Dupont at Paris.

I am not aware of any cases of attachment of the fœtal membranes to the head among monstrosities in the lower animals, but Professor Gurlt of Berlin[‡‡‡] has described several cases in which these membranes were attached to the *abdomen* of different animals, and he has delineated three instances of it in his plates, in the calf, lamb, and kid; Tab. vi. 2 and 3. and Tab. vii. 1. In all these cases the spines and bodies of the animals were much contorted, as is generally the case also with this kind of malformation in the human subject. In four out of the five instances which I have seen in the human *fœtus*, the trunk was more or less completely doubled backwards or laterally upon itself, and in three of the cases, one of the sides of the body was less perfectly developed than the other.*

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[*] London Medical and Physical Journal, Vol. iii. p. 397 and 497. 1800.

[†] Ibid, Vol. vii. p. 385. 1802.

[‡] Specim. Anat. Pathol. de Labii Leporini Congeniti natura et origine. Amsterdam, (1822.)

[§] Journal Complementaire des Sc. Medicales. Tome viii. p. 377–8. 1820.

[||] Anatomie Philosophique, Tome ii. Monstruositiès, p. 151–221. 1822.

[¶] Repertoire d'Anatomie, &c. Tome ii. p. 288. 1826.

[**] Monstrorum Trium cum Secundinis Coalitorum. Berlin, 1829.

[††] Bibliotheque Medicale, (1829) Tome ii. p. 288.

[‡‡] Lond. Med. and Phy. Journ. Vol. iii. 399.

[§§] Ibid, Vol. xxiv. p. 61, (1810).

[||||] Bulletins de la Facultè, &c. Tome v. p. 310. 1817.

[¶¶] Edinburgh Journal of Medical Science, Vol. i. p. 343. 1826.

[***] Archives Generales de Medecine, Tome xxii. p. 313. 1830.

[†††] Dublin Medical Transactions, New Series Vol. i. p. 375. 1833.

[‡‡‡] Lehrbuch der Pathologischen Anatomie der Haus-Säugethiere, Bd. ii. s. 99-143.

If this were a fit opportunity, it would be easy, I conceive, to point out some very striking points of analogy in external figure and internal anatomical structure between the different individuals belonging to these two classes of malformations, and I am further persuaded that, by a study of these analogies, many of the cases of monstrosity, particularly of strongly marked malformations of the head and face, of defective conjunctions in the median line of the body, and of extroversions of the encephalic, thoracic, and abdominal viscera, that are to be found upon the records of medicine, might be shown to be equally referable, in the first instance, to the existence of morbid adhesions of the *embryo* to the *placenta* or membranes of the *ovum*, as their more immediate determining cause, although such adhesions were not observed at the time of birth, from the connecting and often tender bands or membranes of which they generally consist, having been in some instances ruptured in the act of parturition, and in others destroyed during the course of intra-uterine life, the solutions of continuity which they had left upon the body of the *fœtus* having become before birth more or less completely cicatrized and obliterated.

TREATMENT OF PLACENTAL CONGESTION AND INFLAMMATION.

I shall not lengthen out the present part of my paper, by obtruding upon the Society any very detailed remarks upon the prevention and treatment of placentary congestion and inflammation; for on these subjects I have indeed little novel to offer, and few or no modes of practice to inculcate beyond those that are generally acted upon in the daily attempts that are made, to alleviate and remove the several individual symptoms and combinations of symptoms occurring in the state of pregnancy, that I have had occasion to particularize in the course of the preceding observations. The more accurate pathological investigation of the nature of any disease has very seldom led in a direct manner to the developement of any new methods of practice in its treatment, and hence, amid the many and strange revolutions to which medical theory has been subjected, it is singular in the retrospect to remark, how comparatively stationary a number of the leading principles of medical treatment in different affections have at all times remained. But though general and anatomical pathology has not, in the great advances which it has now made, more especially in modern times, led, with some very few exceptions, to the suggestion of any actually new remedial measures, yet, assisted by clinical observation, it has confessedly, imperfect as it still is, proved already of incalculable advantage to practical medicine, in having enabled us to generalize more accurately than before our knowledge and practical application of the ample store of therapeutic agents that we already possess, by, in the *first* place, affording us data to generalize upon the identity of morbid actions and morbid effects in different organs of the body; it has enabled us in many of the complicated diseased conditions of the human economy to detect the true causal relations in which various forms of morbid states and symptoms, coexisting in different and distant parts of this economy, stand to one another,—to distinguish affections that are primary from those that are merely their secondary and sympathetic effects,—to fix upon the individual organ that forms the primitive seat of diseased action, and which, consequently, ought to constitute the main point and object against which all our remedial measures should be, directly or indirectly, aimed; and, besides, modern pathology, in a few remarkable instances, has afforded us important clues, that have served as guides by which we have traced back confirmed morbid states and lesions from their more advanced and more incurable stages to their earliest commencements, and further, it has, in some of these instances, shewn us that the morbid actions of which they consist at these, their first periods of developement, are such as can often be detected by a cautious and careful use of the improved means of diagnosis which it has placed in our power, and at the same time be made the subject of a rational and successful medical treatment.

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* I had some time ago presented to me a delineation and short description of an anencephalous human *fœtus*, to which both of these last remarks strongly apply. I regret that the imperfect history which I have received of this case, does not enable me to state positively if the sides of the large opening in the anterior part of the body, through which almost all the abdominal and thoracic viscera protrude, stretched onwards in a membranous form to the *placenta* or not; but this interesting monstrosity resembles so exactly some of the other instances that I have seen in which this membranous placentary connection existed, that I have little doubt that such was the nature also of the present case. The trunk of this *fœtus* is doubled back to such a degree that the *occiput* nearly touches the lower part of the dorsal spine, to which it is connected by a short web of integument. The spinal column, at the same time that it is thus made to project forwards is curved also towards the left side so as nearly to form a semicircle. The ribs on this side are merely rudimentary, consisting only of a few cartilaginous stumps. The ribs, again, on the right side are long, and form a broad flat thoracic surface. This *fœtus* was the product of a premature labour, as the monstrosities of this class have almost always been.

General blood-letting, repeated or not, according to circumstances, along with more or fewer other antiphlogistic measures, has been long successfully employed by medical men, to subdue the various symptoms direct and sympathetic, local and constitutional, that I have endeavoured in the preceding pages to trace to congestion and inflammation of the *placenta* as their immediate or proximate cause; and the inquiry into which I have entered is, I trust, calculated to show in a clear light, the value and rational character of this practice, upon the general principle of applying to the diseases of this organ the same remedial measures that have been found, by observation and experience, to be best fitted for combating congestive and inflammatory morbid actions in other parts of the body. Upon this general ground also it would seem not unreasonable to anticipate, that, in the preventive treatment of some of the more common forms of abortion, and of the other local effects and symptoms of placental congestion and inflammation, as well as in the treatment of those various but more remotely situated sympathetic and constitutional affections to which these two morbid states of the *placenta*, but particularly its state of inflammation, so frequently appears to give rise,—an active employment of leeching or other local depletory and sedative measures may be attended with highly beneficial results; and be advantageously followed up, if the nature of the case or the obstinacy of the symptoms require it, by blisters and counter-irritation in the neighbourhood of the region of the *uterus*, as has indeed been already recommended to us by some American practitioners, in the management of cases of threatened abortion.* The kind of inquiry into which I have been led may also, I hope, prove ultimately useful, in showing that a large part of the great sacrifice of human life that is constantly occurring from the death of the *fœtus*, and from the act of abortion to which that death gives rise, primarily depends upon morbid actions originating and seated in the *placenta*, and that in many instances these actions are in themselves of such a pathological nature as are generally considered to be amenable to medical treatment. And further, if the view which I have taken of the pathological nature of the adherent *placenta* be correct, namely, that it is the result of a state of inflammatory action in that organ, generally of a chronic character, or, as I ought, perhaps, more properly to say, of a state of adhesive inflammation in the contiguous surfaces of the *placenta* and of the *uterus*, it seems reasonable to expect that we may, by watching more diligently for the first symptoms and advances of this inflammation, be then able to arrest, by the employment of such measures as those above referred to, the morbid action in its earlier stages, and thus avert, or at least diminish, what, as I have already endeavoured to show, ultimately proves one of the principal sources of danger and fatality to the parturient female, and constitutes altogether a case, than which (as Dr Ramsbotham has justly remarked) "there is scarcely one in the whole circle of practical midwifery more pregnant with immediate and impending mischief."* The above remarks on the early detection and on the early and active treatment of placental inflammation are only, if possible, more strongly applicable to the management of the cases referred to at a previous part of the paper, in which placental inflammation shows a tendency to recur in different pregnancies in the same woman. But, indeed, under all circumstances, and in all instances, in employing in the treatment of placentary inflammation and congestion, more or fewer of the various general therapeutic means above alluded to, and such other remedial measures, medicinal, dietetic, and regiminal, as the peculiarities of individual cases are, in the practice of our profession, constantly found to require, we ought ever to be guided and stimulated by the consideration, that on the activity and success of our exertions are dependent not only the present well-being and future safety of the mother, but the health also, and, it may be, the life of her infant *in utero.*

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* See Jackson, American Journal of the Med. Sciences, No. iv. p. 299; and Cenas, in Ib. No. x. p. 547.

(To be continued.)

ART. II.—*On the Sounds afforded by Substernal Aneurisms.*

By WILLIAM HENDERSON, M.D., Physician to the Edinburgh North-Western Dispensary.

HOWEVER difficult it may be to subscribe to the doctrine "dans le diagnostic consiste toute la medecine," no physician who is desirous of avoiding perplexity and diffidence in the discharge of his professional duties can be indifferent to the study of even the most intractable diseases. Although an intimate acquaintance with their phenomena may conduce little towards alleviating the sufferings by which they are accompanied, yet it is often capable of yielding instruction useful to the practitioner of medicine, and interesting to the physiologist, by affording to the former the means of decision in his prognosis, and to the latter illustrations of the healthy functions of the body. The subject of this essay may claim attention on both of these accounts; and should have especial attractions to the physician, because the phenomena connected with it are both very various and dissimilar, in different cases, and are not unfrequently the sources of doubt and difficulty, even to the most experienced and observing.

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* Out of the nine cases of adherent *placenta* extracted in a preceding page from Dr Ramsbotham's work, in two (2, 4) the mothers died, one (2) in eight hours, and the other (4) in three hours after the birth of the child. A third patient (1) out of the nine, died nine days after delivery, but apparently not at all in consequence of the previous adhesion of the *placenta*, or its effects. If we keep this last case entirely out of the calculation, it appears that, out of twenty-three cases in all of adherent *placenta*, described by this author (Pract. Observ. p. 98–141), in nine of the instances the women died, seven of them from hemorrhage, and exhaustion, at intervals varying from one hour and a-half to eight hours after delivery; one from inversion of the *uterus*, apparently the course of two or three hours; and the remaining ninth patient survived till the fifth day, when she sunk under symptoms of reaction and fever.

The following remarks have been derived chiefly from cases which were of a sufficiently obvious nature, and which were studied with the purpose of acquiring means to detect the more obscure instances of the disease by a consideration of the anatomy and signs of the more apparent. A few of those cases I shall give in detail.

The signs of substernal aneurism are subject to variety from the influence of form, position, and the presence or absence of *coagula*. That part of the *aorta* which includes the arch and the ascending portion of the vessel is liable to be affected differently from the other arteries of the body, by acquiring a large size from nearly uniform dilatation, and is also subject, like them, to the sacculated form, resulting from more or less rupture of the inner and middle coats. The external coat and the membranous substances that invest it may be distended to a very large size, while the communication betwixt the cavity of the aneurism and the *aorta* may not equal half an inch in diameter. It is indeed remarkable through what a small aperture a fluid power may be directed capable of causing enormous distention of the outer coat. Scarpa quotes from Palletta a case of aneurism of the thoracic *aorta* which had attained a great size, while the opening that led from the vessel was incapable of admitting a substance larger than a pea. The communication is, however, in the majority of cases, much larger, so large, indeed, in some, that the sac may have a diameter at its mouth equal to that at any other point of its extent. The relative size of this opening seems to have a material influence on the sounds emitted by the aneurism.

Aneurismal sacs may or may not contain *coagula*. When present these many be arranged in concentric laminæ within the aneurism, so as to present no obstacle to the free passage of the blood through the contiguous part of the vessel, or they may project into the vessel, and oppose themselves to its current, a remarkable instance of which is afforded by Case I. Sacculated aneurisms of considerable size are not commonly altogether void of *coagula*. One of this kind I had an opportunity of witnessing, in which the sac was as large as an infant's head, and the opening leading into it but two inches in diameter; yet it contained no deposition of fibrine. It had produced death by the discharge of its fluid contents through a small slit into the cavity of the right *pleura*.

The ascending *aorta* may yield in any part of its circumference so as to produce aneurism. The direction of the enlargements is most commonly towards the right side.

I have enumerated most of the essential causes of variety in the phenomena of these aneurisms; others will fall more conveniently under consideration in the sequel. These phenomena, though not difficult to detect, demand a careful analysis. A too prevalent omission of detailing them with accuracy, and of investigating the morbid conditions found in connection with them, is chiefly to be blamed for the discredit still attached to the diagnosis of substernal aneurisms. M. Bertin, and after him, Dr Hope, have thought no such discredit applicable to the subject. Yet a very moderate course of observation will suffice to show that neither has described all the varieties in the signs, nor has been altogether accurate in his instructions for the diagnosis.

A substernal aneurism may give rise to two successive sounds corresponding in point of time to those of the heart, or may occasion but one sound, synchronous with that of the ventricles. These are to be understood as originating in the aneurism, and require for their production that it should be altogether or nearly without *coagula*. The sounds which are heard over the aneurism, when filled with coagulated fibrine, are different both in their nature and in their origin; they are transmitted by, but do not originate in, the aneurism. In one sense, therefore, it may be said with truth, that substernal aneurisms are either with or without sound.

When two sounds originate in the aneurism, they always, according to my experience, possess more or less of the rasping noise; when one only has its rise in the tumour, it may have either this rasping sound, or may be pure, in some measure similar to the ventricular sound in health. I am aware that cases are on record in which two sounds totally free from rasping, and louder than in the region of the heart, have been heard in the site of the aneurism. The circumstance of the greater developement of these sounds in the situation of the aneurism has suggested the opinion, that there they must have been produced. Such an opinion is not well founded in so far as the second of the sounds is concerned; for it has been well ascertained that the second sound of the heart is often audible, considerably higher in the chest than the place occupied by that organ, in a greater degree than in the region of the heart itself, where no aneurism has been found to account for the fact. The clear first sound of the aneurisms in question most probably originated at the seat of the disease, in a manner that shall afterwards be mentioned; but that the second has had its source at the same place is rendered extremely questionable, by the circumstance that no reasonable conjecture can be formed of the way in which it could be produced there, and by the fact just referred to, that the second sound of the heart is capable of being better heard at a higher point than the position of the heart itself. The greater proximity of the *aorta*, in consequence of its enlargement, to the anterior wall of the chest and to the ear of the observer, may afford one condition favourable to the better transmission of the second sound,—an idea which derives additional probability from the well founded opinion, that what is called the second sound of the heart is actually produced in the *aorta* where the sigmoid valves are attached.

In a former number of this Journal, I made a brief allusion to a case in which two rasping sounds were heard on the projections of an aneurism, which, the second in particular, were found to decrease as the examination extended towards the heart. The projections were on the right side of the *sternum*, and out of the direction of the ascending *aorta*. The loud and rough sounds corresponded with the rise and subsidence of the aneurismal swellings. On dissection the sac was found to be empty, elastic, capable of containing a quart of fluid, and to communicate with the *aorta* by a comparatively narrow opening. The sounds seem to have originated at the orifice of the tumour during the influx and retrocession of the blood, for the lower margin of the entrance to the sac was the sharp edge of a thin, elastic partition, which separated the *aorta* for the first inch and a half of its course, from the cavity of the aneurism, and which, from its projecting into the currents to and from the aneurism, was well fitted to be thrown into vibrations. The valves of the *aorta* were quite adequate for their functions, so that the rough second sound heard in the aneurism could not have resulted from reflux of blood into the ventricle. In certain cases of diseased aortic valves with permanent patency of the opening a double rasping sound may be present. Yet this can hardly be confounded with the case in which an aneurism gives rise to these sounds, as the latter is also distinguished by an impulse, and dulness on percussion, in the situation of the sounds, and, besides, the second *bruit* in the case of permanent patency has its greatest developement usually at a point corresponding to the situation of the sigmoid valves, while sounds emitted by aneurisms are loudest at the upper parts of the chest. All cases of sacculated aneurism do not cause a double *bruit*. In many the passage from the artery to the pouch may be so wide as to render the production of a murmur during the reflux of the blood impossible. Such pouches have but one proper sound, which accompanies the first of the heart, and may have a pure character like the latter. The sound peculiar to the contraction of the ventricles, when not converted into a rough murmur, is most audible in the region of the heart, so that we cannot consider the clear aneurismal sound in question as a reverberation of this, because it is louder in the situation of the aneurism. We must therefore look for its cause in the latter place. I conceive that the stroke of the expanding sac against the *sternum* or ribs, or the sudden infringement of the wave of blood against these solid parts, affords a very probable explanation of the phenomenon,—at all events such actions are perfectly adequate to produce such a sound. This opinion of its origin derives additional support from the fact, that in ventral aneurisms no such pure sound is ever audible (there either being no sound at all in these, or one with more or less of the bellows murmur,) as the sac in the course of its expansion encounters no hard body to strike against. Other cases occur in which a sound thus produced is followed by another perhaps equally loud and pure. For the reasons already given, I am inclined to consider this as a transmission of the sound produced by the flapping of the sigmoid valves. The following case will show that a second sound of a loud character may be heard at a considerable distance from the valves, under circumstances which justify the opinion that it originated from their action.

Case I. The patient was a man upwards of 50 years of age, and had been the subject of aneurism for above two years. From the left clavicle down to the sixth rib of the same side, and from the right side of the *sternum* as far to the left as the lateral curve of the ribs, there was complete dulness on percussion, and absence of all respiratory sound, except immediately beneath the clavicle, where a distant murmur was heard. In the left axilla also a faint respiratory murmur was audible, and occasionally a sibilous ronchus. On the right side superiorly, and in front, the respiratory sound was puerile. On the back, the right side gave a better sound than the left when percussed, and the sound of respiration, although not well developed on either side, was more distinct on the right. On no part of the space remarked as having been dull on percussion was any thrill communicated to the hand when the patient spoke. Over the whole extent characterized by this dulness an impulse was felt synchronous with the beat of the large arteries of the neck. It was distinct immediately within the coracoid process of the left scapula, and more so at the upper third of the *sternum*, and contiguous parts of the left ribs. In the latter place it was of a slow character, as if caused by a gradual effort from within. At the inferior part of the *sternum* the impulse was more energetic than elsewhere, though it did not raise the head leaning on the stethoscope more than at the upper parts. Over the superior half of the *sternum* and left side of the chest anteriorly, the sound which accompanied the impulse was barely distinguishable. After the slow impulse in these parts had terminated, and while the heave of the chest produced by it was subsiding, a remarkably clear and loud sound was audible, bearing a very striking resemblance to the sudden shutting of a pump-valve in the immediate vicinity of the ear. This sound was of nearly equal intensity at all points where the impulse existed. The first sound was distinct only at the lower part of the *sternum*, and in the region of the left ventricle, yet even in these situations it was scarcely so strong as usual. Nothing like a rasping or bellows sound was anywhere audible. I did not remark either the impulse or sounds posteriorly, but both sounds could be heard on the right front. There was no prominence of the left side, except during the impulse, and then only to a slight degree. The voice was hoarse and husky.

He had anasarca of the body and lower limbs; and the left arm was œdematous. The pulse was imperceptible at the wrist; in the right arm the pulse was very small, of moderate rapidity, and regular. His respirations were not more frequent than natural. He could not lie on either side for more than a few minutes without oppressive dyspnœa, and was easiest when leaning forwards, the only position in which he could sleep. Death occurred six weeks after this account was drawn up.

Dissection.—The pericardium contained about four ounces of serous-like fluid. The heart was of the natural size, and lay, in consequence of pressure from above, more transversely than usual, so that a part of the base of the left ventricle lay behind the lower part of the *sternum*. A large aneurismal tumour rested on the heart, filled up the space behind the *sternum*, and extended across the chest towards the left, concealing the lung, and occupying the whole space from the clavicle to the fifth rib in front; it likewise extended towards the spine, and had caused caries of the bodies of several vertebræ;—it was not in contact with the ribs posteriorly. On laying open this mass it was found to consist chiefly of a sacculated dilatation of the left side of the ascending *aorta*, and the concave or inferior wall of the arch. The aneurism commenced at the distance of an inch from the aortic valves, and extended beyond the origin of the left subclavian artery. The convex surface of the *aorta* was also somewhat enlarged, but the great bulk of the aneurism hung downwards from the arch. The sac was occupied by numerous laminæ of fibrine, scarcely more compact at the sides than in the centre. A dirty grumous-looking fluid intervened between the layers. It seemed probable that the blood might reach the descending *aorta* by passing between the vertical layers of *coagula*. In the midst of these, there was one channel which appeared more in accordance with the usual course of the vessel, and formed an irregular track from the heart to the artery beyond the tumour. The left subclavian artery was very nearly obliterated at its origin, and was stretched over the extreme left of the aneurism. The sigmoid and other valves were quite sound.

This case possesses interest from the corroboration which it affords to M. Rouanet's theory of the second sound of the heart. This organ itself was healthy, and therefore not capable of causing the clear and loud second sound mentioned in the foregoing narration. Nor was there any thing in the form of the aneurism to justify the supposition that the sound under consideration was entirely new, and dependent on the disease in the vessel. A brief review of the probable action of the aneurism will throw some light on the subject. Each wave of blood from the ventricles must have encountered much difficulty in finding its way through the maze of *coagula* contained in the tumour. The result would necessarily be, that these would be compressed, and their containing sac dilated, by the force of the ventricular contraction, on the cessation of which force the elastic *coagula*, aneurismal walls, and elevated ribs, would conspire to throw back with energy a large portion of the blood on the valves of the *aorta*, by which their descent would be rendered more vigorous, and their sound consequently louder. The solid contents of the aneurism would serve to conduct the sound thus produced to the remotest portion of the tumour. Independently of this medium of transmission, the second sound of the heart is rendered audible by aneurisms, at a considerable distance from the valves; one instance of which is narrated by Bertin (page 95.) He states that in a case of aneurism as large as the fist affecting the ascending *aorta*, in addition to other signs, the second sound of the heart (or sound of the auricles, as he calls it,) was well heard towards the clavicles, and without murmur, while it was less distinct in the region of the heart.

Of the sounds accompanying general enlargement of the calibre of the ascending *aorta* and arch little need be added to what has already been said of sacculated aneurisms with a very wide passage leading from the *aorta*. When complicated, as it sometimes is, with disease of the aortic valves, and permanent patency of the aperture surrounded by them, this kind of aneurism may present two rasping sounds along the *sternum*. In order to distinguish this state of disease from the sacculated aneurism, at the orifice of which two rasping sounds are produced peculiar to itself, it will suffice to remember what has already been said regarding the second sound in cases of permanent patency, and that in mere dilatation the impulse is much less on any part of the *sternum* than immediately above this bone.

The presence of a hoarse rasping sound in the carotids is characteristic of the several forms of substernal aneurism which have not been consolidated by *coagula*. It is likewise occasionally met with in these vessels in cases of considerable narrowing at the mouth of the *aorta*, especially when complicated with greatly increased power of the heart. The state of percussion and the absence of preternatural impulse in the course of the *aorta* will enable these cases to be distinguished. The pathological conditions necessary for the production of these sounds in the vessels beyond the aneurism are merely the existence of a considerable expansion beyond a part of much more limited capacity,—conditions which are characteristic both of aneurisms and of the valvular disease referred to. Roughness of the inner surface of the aneurismal dilatation, or of any other part of the apparatus, does not seem to be requisite, as the following case will declare. The patient was a man affected with popliteal aneurism of the left leg, who died about a fortnight after the femoral artery had been tied. The tumour pulsated strongly, and had attained the size of a hen's egg. A distinct thrill was perceptible at the surface of the tumour near its centre. At the upper boundary of the tumour there was a moderate *bruit de soufflet*, which gradually increased until it acquired, at the centre, a rough and superficial rasping noise. Beyond the centre this noise continued, but less distinctly; and for three inches below the tumour, in the direction of the posterior branches of the vessel, a deep-toned, hoarse, and distant noise was heard, exactly resembling the sound in the carotids of persons affected with the above mentioned forms of substernal aneurism. On inspection after death the popliteal artery was observed to open abruptly into the tumour at its upper extremity, and to lead from the aneurism by a canal of the natural size, at the distance of more than two inches from the superior opening. In aneurisms that become filled with *coagula*, the conditions necessary for producing the sound under consideration are no longer present, and the phenomenon ceases.

Aneurisms contiguous to the heart may become passive instruments for the transmission of the two sounds which originate at the latter. The change which they undergo in order to acquire this property is their conversion into solid masses, by the deposition of coagulated fibrine in their interior. They are thus fitted, intervening as they do betwixt the base of the heart and the surface of the chest, to conduct sounds from that organ to the ear of the observer. I subjoin two cases in illustration of these statements.

CASE II.* On the 3d of August 1835, I examined the subject of this case; he died on the 5th. He was about 45 years of age. His cough was frequent, and he required to lean forwards constantly in bed, as his respiration was much embarrassed, and became worse on his assuming the recumbent position; voice natural. At the upper part of the chest and on the right side close to the *sternum*, there was a prominence of considerable size involving the sternal ends of the three first ribs and their cartilages. At this projection there was a distinct impulse, not, however, of a powerful nature, and less than the synchronous impulse in the region of the heart. Two sounds were audible at the situation of the tumour, coincident with those of the heart, and similar in character. The impulse of the heart was preternaturally strong, and its sounds free from murmur and roughness. The stooping posture, which the patient was obliged to maintain, rendered a more careful examination impossible, and the uneasiness he suffered on sitting erect made any change in his position for the purpose of extended exploration in front unjustifiable. I did not ascertain whether the sounds were less loud at the tumour than in the region of the heart,—the difference, if any, must have been slight. Behind there was dulness of percussion at the upper third of the right side; and, at the same place, especially close to the spine, a moderate impulse. At the inferior angle of the scapula, and towards its inner side there was very strong tracheal respiration and tracheal voice. In the other parts of the same side posteriorly were imperfect respiratory murmur and catarrhal rattles, while percussion gave a rather better sound. On the left back the percussion was good, the respiration natural, and a slight impulse perceptible superiorly. Immediately beneath the right clavicle, and for a short distance downwards, there was tracheal respiration and bronchophony. There was no sound in the carotids. Pulse at the wrists nearly equal in both arms, regular, and somewhat accelerated. The examination could not be made more minute in consequence of the annoyance the patient appeared to feel.

Dissection.—6th August.—The heart was invested with an adherent pericardium; the medium of connection consisted of thick meshes of lymph, of a soft consistence, and gelatinous appearance. The heart was flaccid; its left cavity dilated a little; the walls of natural thickness. The aortic valves presented very trivial thickening at their bases. The right cavities were natural. About half way betwixt the valves and the origin of the *arteria anonyma* the *aorta* presented an opening, on its right side, of an ellipitcal form, the greatest diameter of which was an inch and a-half. This hole was bounded by a sharp margin; at one place the margin was formed by the edge of a bony plate. This opening led into a large sac, fully the size of a newly born child's head, occupied by firm masses and layers of coagulated fibrine. The tumour adhered strongly to the *sternum*, and to a space two inches long of the second rib of the right side. The upper part of the right lung covered with its anterior margin a considerable portion of the tumour. The latter had pushed the rest of the lung downwards, and intervened between it and the right bronchus, in such a manner that the tube was stretched over the back of the tumour, and was flattened betwixt it and the angles of the ribs, while the lung lay for the most part beneath and in front of the aneurism. The position of the bronchus corresponded with the place at which the tracheal respiration had been heard posteriorly. The left bronchus and trachea were dragged a little to the right of their usual situation. The *aorta* was a good deal studded on the inside with yellow thickened patches. All its branches were pervious. About five pounds of serous like fluid were in the cavity of the right *pleura*.

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* For permission to publish my reports of this and the preceding case, I am indebted to Dr Shortt, in whose Clinical Wards the cases occurred.

Case III.—The subject of this case was a woman above the middle age. No dissection was allowed; yet it cannot be doubted that the aneurism was rendered solid by *coagula*, as in the preceding case. The whole *sternum*, and especially its upper part, was more prominent than usual. Between the first and second right cartilages a tumour projected, equalling in size two-thirds of a hen's egg, and of a conical form. The colour of the skin over the tumour was natural. No pulsation could be distinguished in the tumour by the eye, but on pressure with the fingers a distinct but moderate impulse could be felt. There were two sounds audible in the projection, without any murmur or rasping, similar to those in the region of the heart, but not so loud. These two sounds were heard also along the space which intervened between the tumour and the region of the heart, and gradually increased towards the situation of the latter. At the aneurism the second sound was rather louder than the first. There was very little impulse in the situation of the heart, where the sounds were moderate and natural, but they were more distinct than usual along the right side of the *sternum*, and neighbouring part of the chest. There was no sound in either carotid, nor thrill anywhere. The pulse was moderate. Percussion was dull on the projecting parts, which are tender to the touch, tolerably good below the clavicles; bronchophony below the left clavicle, and also behind, at the supra-spinal fossa; respiration was pretty distinct on the back, imperfect under the left clavicle; catarrhal rattles on both sides of the chest; cough extremely harassing and frequent, with considerable expectoration, and dyspnœa sometimes great. She died about a month afterwards; and, on examining the exterior of the chest, the tumour was found still nearly as large as during life; it felt solid, and, when pushed back into the chest, left a considerable aperture between the ribs.

She had laboured for three years under symptoms of disease in the chest, and the tumour had appeared nine months before death.

Cases of this kind cannot be confounded with that very different form of aneurism in which the sac is still capable of admitting blood at each contraction of the ventricles. In the latter, it is true, there are two sounds, both of which may be free from murmur, but the first is louder than that of the heart, and most likely results, as has been said, from the shock of the sac or its fluid against the *sternum* or ribs, while the second can be accounted for only on the supposition that it is transmitted from the valves. Besides, aneurisms not filled with *coagula*, have a much stronger impulse than the others.

In aneurisms not consolidated, the second sound, as heard in the tumour, and at the heart, is subject to considerable variations, some of which are difficult to account for. Thus the second sound in some cases may become gradually louder until it has its maximum at the base of the heart; while in others it may be heard much more distinctly near the top of the *sternum* than at the heart. Bertin gives one instance, already mentioned, of the latter variety, in which the tumour was as large as the fist, and consisted of a dilatation of the ascending *aorta*. The first sound was, at the upper part of *sternum*, a very distinct murmur, while the second was heard without murmur, and well developed, towards the clavicles, but very confusedly in the region of the heart The left ventricle was three times as large as the right. What effect this state of disease might have had on the transmission of the second sound over the region of the heart is not determined; usually, however, dilatation of the heart is attended by increased developement of both sounds, at the situation of the organ, as well as over the greater part, or whole of the chest.

Whether any cases occur in which the second sound is nearly absent from the tumour, and situation of the heart, at the same time, I cannot venture to assert. But I am inclined to think that there may be forms and conditions of aneurism near the centre of the circulation calculated to weaken the forces which are concerned in the production of the second sound, and thereby to render the latter much less distinct than natural, both at, and in the vicinity of, the heart. The very imperfect notes which I have preserved of the examination made of the following case, while the patient lived, afford perhaps a probability that this conjecture may prove correct. The exploration of the chest was confined to the region of the heart, and therefore the condition of the second sound in the course of the *aorta* was not ascertained.

Case IV. The patient was a man about 30 years of age. I saw him first in January 1833, suffering from a severe attack of pneumonia. In October of the same year, I learnt that soon after the illness referred to had subsided, he began to be annoyed by palpitations, and subsequently by dyspnœa, both of which had gradually increased to a very distressing degree. I found the impulse of the heart increased in degree and in extent. A distinct but not strong bellows-sound attended the contraction of the ventricles, the second sound was without this complication, and so faint as to form a very indistinct click, inaudible on the right edge of the *sternum*, where the murmur of the first sound was more obscure. There was double pulsation in the jugular veins, and even in the small veins of the skin at the top of the *sternum*. Face livid; body required to be constantly preserved in an elevated posture, owing to the excessive dyspnœa; pulse full, sudden, and about 86.

He survived until the middle of November. On dissection both ventricles were found very much enlarged, but the walls of the right alone were increased in thickness. The auricles, the right especially, were dilated, and their columnæ much developed. The right auriculo-ventricular opening would admit the extremities of five fingers at once with ease. The mouth of the *aorta* was of its natural size; its valves were affected at their bases by a small but preternatural deposition of cartilage. At the point where the *aorta* crossed the pulmonary artery, there was an aneurismal pouch that might have contained an ordinary egg. The walls of this pouch had coalesced with those of the pulmonary artery, and at its *fundus* there were two openings into the latter vessel; one, the larger, admitted the extremity of the little finger. The walls of the sac were thinner than those of the *aorta*. A little beyond the aortic valves the whole circumference of the vessel was enlarged, but inconsiderably, and one or two moderate concavities or partial dilatations existed along the ascending portion of the vessel. The origin of the *arteria anonyma* was considerably dilated The inner surface of the ascending *aorta* and arch was covered with yellow, somewhat elevated, patches with here and there an earthy plate. The interior of the pulmonary artery around and beyond the aneurismal apertures exhibited some steatomatous deposition, but was not otherwise diseased. There was no external tumour.

It appears from the preceding description that the *aorta* must have lost much of its elasticity, and was therefore little fitted to throw the blood with much force against the sigmoid valves, after the contraction of the ventricles had ceased. It was very evident, from the position and size of the aneurism, that when it was distended it must have so compressed the pulmonary artery as to have prevented the blood from traversing that vessel freely. The right ventricle and auricle seem to have acquired their increased size and strength probably from this cause. The distended aneurism would also have had the effect, from its projecting into the pulmonary artery so near its origin, of retarding the recoil of the blood that had once passed it, from reaching the valves, hence, in all probability, another source of feebleness in the second sound, especially at the right side of the *sternum*. Had the second sound in the aneurism really been well developed, it may be supposed that it might have been heard pretty distinctly in some part of the region of the heart, when it is remembered that the aneurism was situated within half an inch of the base of this organ. Supposing the second sound of the heart really to depend upon the descent of the sigmoid valves, as there are the strongest reasons to believe, we should expect that any modification of the usual condition of the parts concerned in producing the requisite action of these valves would cause an alteration in the degree of the sound, whether by increasing it as in Case I. or by rendering it feebler, as in the last case. Mere rigidity of the *aorta* contiguous to the heart may not be enough to weaken the second sound, because the large branches arising from it may be capable of causing a recoil against the valves in consequence of there existing between them and the latter a tube incapable of yielding, and because the fluid medium by which their systole exerts its power is incapable of compression. How far these opinions may serve to explain the different degrees of intensity by which the second sound is characterized in different cases of aneurism, and other diseases of the *aorta* in the vicinity of the heart, has yet to be determined.

I think the following conclusions have been established or rendered probable, either in this paper or in other essays.

1st, That aneurisms of the ascending *aorta* may or may not have sounds originating from themselves.

2d, That when two sounds *originate* in the aneurism they are produced at the opening by which it communicates with the *aorta*, and that only sacculated aneurisms can originate two sounds, and these of a more or less rough character.

3d, That, when two pure sounds, *i. e.* sounds free from morbid murmurs or rasping, are heard in the situation of an aneurism, one only originates at the tumour, the other being communicated from the sigmoid valves.

4th, That the second sound of the heart is susceptible of increase, and probably of diminution, from diseases of the *aorta* capable of modifying the energy with which the blood recoils upon the sigmoid valves.

5th, That aneurisms near the heart, consolidated by the formation of fibrinous concretions in their interior, transmit the sounds of the heart, and that these sounds diminish on being thus transmitted.'

6th, That it is immaterial in the diagnosis of substernal aneurisms whether the first sound be rough or pure. See Dublin Journal, Vol. v.

7th, That it is equally immaterial in the diagnosis of these aneurisms whether the second sound be rough or pure; that, if the former, it can be the result only of one of the two following conditions, either of a sacculated aneurism *originating* two sounds, or of permanent patency of the aortic opening. —See Edinburgh Medical and Surgical Journal, No. cxxii.

8th, That it is immaterial in the diagnosis of substernal aneurisms whether the second sound (if pure) be heard more, or less, distinctly in the region of the heart, than nearer the seat of the aneurism.—See Bertin, p. 95; Hope, Lond. Med. Gaz. 1829, &c.

9th, That, although certain preternatural sounds at the upper part of the *sternum*, or on the superior part of either side of the chest in front, together with dulness on percussion and morbid impulse at the same places, afford means of detecting the great majority of substernal aneurisms, yet it is possible for an aneurism consolidated by *coagula*, and without external tumour, to exist without our being able to distinguish it from other solid masses alike capable of conducting the two sounds of the heart, and communicating its impulse.

21 *St Andrew Square, Nov.* 1835.

ART. III.—*Cases of Aneurism, with remarks.* By WILLIAM AUCHINCLOSS, M. D., Lecturer on Surgery, Surgeon to the Town's Hospital, Glasgow, &c.

I. ROBERT BLACKWOOD, aged 65, by trade a weaver, was admitted into the Royal Infirmary in June 1833, though he only came under my care the 21st of the following month.

Under the left clavicle is a strong pulsating tumour, which extends, in the course of the subclavian artery becoming axillary, from the outer margins of the *scaleni* to the middle of the lower third of the *axilla*. It is oblong and somewhat pyriform-shaped, measuring fully six inches, by two and a-half in its shorter diameter. The portion of the tumour above the clavicle is less in thickness than the thumb, and tapers to a point at its apex, which is close to the outside of the *scaleni* muscles. The swelling at this point distinctly involves the whole circumference of the artery. The most prominent part of the tumour is below the outer half of the clavicle, being about the size of half a large orange, and projecting considerably beyond the anterior level of that bone. The clavicle, however, is in no way displaced, and there is neither swelling nor discoloration of the integuments. The pulsation, which is synchronous with the beat of the heart, ceases on the artery being pressed against the first rib, when the tumour becomes greatly diminished, but immediately returns to its former size on the pressure being removed. The pulse at the wrist is very feeble, and the lower part of the axillary artery beats much less strongly than that of the opposite side. The action of both carotids, and of the right subclavian, seems rather augmented, communicating to the finger a slight jarring sensation, but without any corresponding increased action of the heart.

The affected limb is a little swollen and œdematous, and he has frequent pain and numbness extending to the fingers. There is no difference of temperature in the two arms, though he says that the left is much more sensible to cold than the right. With the exception of cough and *dyspnœa*, both of which are aggravated on assuming the horizontal posture, his general health is in every respect quite good. His countenance is cheerful, and otherwise he is free from all sort of anxiety.

The swelling made its first appearance above the clavicle, eighteen months ago, when about the size of a field bean. From that time it gradually became larger, extending downwards in the course of the artery; but he represents its progress to have been much more rapid within the last month, than at any previous period from its commencement. He followed his usual occupation as a weaver till three weeks ago, when he was obliged to abandon it in consequence of the uneasy feeling in the arm. He is not sensible of having received any injury, and has used no particular treatment.

A consultation having sanctioned the operation of tying the subclavian artery, it was yesterday (23d July) performed in the following manner. The patient being placed in a reclining position on a table, with the left arm kept close to the chest, the shoulder depressed, and the head turned towards the opposite side, the integuments were divided to the extent of two inches and a-half, in the direction of, and a little above the clavicle, from within outwards, commencing about half an inch from the sterno-clavicular articulation. This was done by one sweep of the scalpel, the skin having been previously pinched up longitudinally, and held so between the fore-finger and thumb of my assistant and myself. Another incision, an inch long, was carried up perpendicularly from its middle, immediately behind the posterior edge of the sterno-mastoid muscle. The flaps being then dissected back to a short distance, and the external jugular vein held outwards by a blunt hook, the *platysma myoides* and cervical *fascia* were divided the whole length of the external incision. The dissection was afterwards cautiously continued through the cellular substance, till such time as the surface of the anterior *scalenus* was fully exposed, substituting during this stage of the operations the finger and handle of the knife, as much as possible, for its cutting edge. The omohyoid, as it stretched across the space, was divided. This part of the operation proved rather tedious, in consequence partly of the smallness of the space exposed, but more particularly of the thickening and gluing of the cellular substance to the other textures in that situation. The blood-vessels, both veins and arteries, as they presented themselves, were successively held aside, and, with the exception of a trifling vein and a very small arterial vessel, none were divided.

For more complete exposition of the parts, however, and in order to afford sufficient space, it being intended from the first to secure the artery in its middle division, as it passes between the *scaleni*, the clavicular attachment of the sterno-mastoid was sacrificed. Considerable difficulty was now experienced from the swollen state of the internal jugular vein, which, being fully twice the size of the thumb, completely overlapped the anterior *scalenus*. The subsequent steps of the operation were greatly facilitated by the use of Colles' metallic retractors, or flexible spatulas, by which the different parts were not only kept separated and more completely seen, but in every way protected from the knife. The dilatation of the artery being found to reach close to the acromial margin of the *scalenus*, the outer third of that muscle, through its entire thickness, was cautiously divided, the phrenic nerve being held inwards. The *scalenus*, which had previously been separated to a very limited extent from its posterior attachment to the artery and subjacent muscle, was also drawn a little inwards, and by this means, complete exposure of the vessel throughout that part of its course, was obtained. The artery, though enlarged to about one-fourth more than its natural size, felt quite sound, and a ligature was therefore passed under it by means of a common aneurism needle, from below upwards, and tied, immediately on which the pulsations in the aneurismal tumour ceased. Some little difficulty was experienced in drawing the knot with the fore-fingers, but after a short time this was effected without the use of any mechanical means. With the exception of slight thrilling along the arm, he felt no other sensation when the ligature was tied. He bore the operation well, and expressed himself after it, as in every way comfortable. The edges of the wound were brought together, and retained by two stitches and adhesive plaster. He was then put to bed, with his head and shoulders slightly elevated, and the arm bent over the fore part of the chest, and wrapped in flannel. The whole lasted about forty minutes.

The principal difficulty consisted in separating the matted cellular substance from the surrounding nerves and bloodvessels, before coming down upon the outer edge of the *scalenus.* I feel satisfied, that, without the aid of the metallic retractors of Dr Colles, I should have had the greatest possible difficulty in cutting through the outer third of that muscle, and in conveying the ligature under the artery, from the enormous size and overlapping of the internal jugular vein. Blunt hooks would have been altogether inadequate for this purpose. Those used on this occasion were made of flexible sheet copper, a line and a-half in thickness, and which could be bent to any shape. I have frequently witnessed the good effects of these retractors in the hands of the late Dr George Monteath, who had a complete set of the real retractors recommended by Dr Colles. They were made of a species of Britannia metal. I was indebted for the suggestion of flexible copper ones to Mr Liston, who speaks of their good effects in a case related by him in the 16th volume of the Edinburgh Medical and Surgical Journal, and where, on account of a diseased state of the artery, he had to divide the outer third of the anterior *scalenus*, as was done in the case under consideration.

In the evening, there was little difference in the temperature of both arms, the thermometer in either axilla standing at about 94° of Fahrenheit.

He had a good night, and the cough has not been more troublesome than before the operation; and says he feels quite easy. Pulse 94, regular, but without any other feverish symptom. A copious stool by clyster yesterday evening. No effect hitherto from two colocynth pills this morning. Since the morning has been under the use of the saline mixture, with ʒss. antimonial wine to the ℥vi. mixture.

To be bled to ten oz. and to have a clyster if necessary in the evening.

25th, 2 o'clock P. M. Yesterday he was bled to ten oz. Has remained much in the same state as reported at the visit till about half-past eight o'clock in the evening, when he was first observed to be rather drowsy, though when roused he appeared otherwise perfectly sensible. The pulse at that time was equally quick and rather irregular. The medicine not having operated he was ordered an injection, by which he had a good stool. Cloths wetted in the evaporating lotion to be applied to the head, and the saline mixture ordered to be discontinued. Passed a very indifferent night. Vomited at three o'clock this morning, and again at seven o'clock a quantity of greenish fluid. The drowsiness by that time had greatly increased, though he still was sensible when roused. The pulse continued equally quick and variable as to irregularity. The pupils were contracted. At ten o'clock the head was ordered to be shaved, and cloths wetted in iced-water to be kept constantly applied. A sinapism was at the same time applied to the *epigastrium*, and he was ordered to have small quantities of soda-water to drink. He has had no return of vomiting, and has otherwise much improved since shaving the head. At present little or no tendency to drowsiness and expression of countenance quite cheerful. Says that he feels in every way comfortable. Pulse regular, and about 90; heat, &c. of both arms the same.

Five o'clock P. M. Continues to improve. *To have two grains of calomel every second hour.*

He relapsed into the same drowsy state about nine o'clock in the evening, up to which period he had been doing well. Strong sinapisms were then applied to the nape of the neck, and to the calves of the legs, but without effect. Comatose symptoms supervened during the night, and he died apoplectic at a quarter past eleven o'clock this forenoon, sixty-eight hours and a half from the period of the operation.

Inspection twenty-six hours after death.—The blood-vessels of the brain were greatly engorged. There was a considerable quantity of serum effused under the arachnoid tunic, in the ventricles, and at the base of the cranium. On section, the brain exhibited numerous red points of a darkish hue, from the oozing of venous blood. The substance of the brain felt rather softer than natural.

The heart was a third larger than natural, though otherwise healthy. The *aorta* and the different vessels proceeding from it were also somewhat enlarged. The inner surface of the *aorta* was in some parts thickened and rugous, and in others exhibited numerous small deposits of atheromatous matter.

The left subclavian was larger than the right, being about a fifth more than the usual size of that vessel in an adult person. Its inner surface was not thickened, but in several places between its origin and the seat of the disease small depositions had taken place. The one nearest to the dilatation was about the size of a split coriander seed, situated more than half an inch nearer the heart than the part to which the ligature had been applied. This was done at the commencement of the outer half of the artery, as it passes between the *scaleni.* The inner and outer *coagulum* of lymph had formed, both being adherent to the internal membrane. The aneurism was found to extend from the outer margins of the *scaleni* down to near the base of the *axilla.* It was about five inches and a half in length, and of a pyramidal and somewhat flesh-like appearance. The ligature was half an inch from the thyroid axis. The *thoracica acromialis* and *longa* arose from the sac. The enlargement commenced at the exit of the artery from between the *scaleni.* All betwixt this part and the clavicle, its circumference was rather more than twice the natural size of the vessel, gradually increasing, however, from the *scaleni* downwards. Below the clavicle it became greatly larger, being fully two inches and a half in diameter. It continued of nearly the same size to within an inch of the base of the *axilla*, where it became suddenly less, the artery being scarcely the natural size at its exit from that cavity.

The axillary *plexus* of nerves was spread out and in some parts flattened over its anterior surface. The outer head of the median nerve was imbedded to the depth of nearly an inch apparently in its substance; but on removing the surrounding parts, the tumour presented two rounded and sloping prominences, one on either side of the nerve. The larger of the two was about the size of half a plum, and situate on the inner side. The general body of the aneurismal tumour embraced the whole circumference of the artery; but there was greater thinning of the *parietes* of the sac in the situation of the prominences than elsewhere; and, on cutting open the tumour from behind, the inner coat, rugous and very much thickened all over, was entire to a little way within the edge of the small pouches, corresponding to the prominences externally, where it was partly destroyed. Organized lymph was firmly adherent to the inner surface of these pouches. The rest of the contents of the aneurismal sac consisted of about ℥ iv. of dark blood, partly coagulated and partly fluid. The branches given off by the artery, on the inner margins of the *scaleni*, were enlarged. On carrying the dissection to near the lower part of the neck, several small deposits of purulent matter, varying in size from a pea to that of a field bean, were observed; more particularly at the anterior part of the *trapezius* and between the sterno-hyoid and thyroid muscles. No inflammation of the veins, however, could in any part be discovered.

The preceding case excited much interest, and was seen by most of the members of the profession in this city. The patient had been in the hospital for upwards of a month before coming under my care, and during that period was repeatedly the subject of consultation. In that way, it may be remarked, the tumour had been handled much more than it ought to have been, under any circumstance.

With regard to the propriety of tying the subclavian artery, much difference of opinion existed, as might be expected. Some of the gentlemen were against, and others for the operation, while a third party expressed a somewhat dubious opinion. Those opposed to the operation grounded their objections on the following circumstances.

1st, The advanced age of the person and consequently the great likelihood of the arteries throughout his system being in a morbid state.

2d, The extent of the local disease being such as to preclude the possibility of applying the ligature to a sound portion of artery on the outside of the *scaleni* muscles.

3d, Supposed aneurismal diathesis from the sensation communicated to the fingers of augmented size of the opposite subclavian and carotid arteries.

On the other hand, those favourable to the operation considered it justifiable for the following reasons.

1st, Though the dilatation extended close to the outer margin of the *scalenus*, yet it seemed to stop there; and, therefore, that muscle might be partly incised without injury to the phrenic nerve, and so held inwards as to permit of the ligature being applied to a sound portion of the artery in the second division of its course, or, in other words, as situate between the *scaleni* muscles.

2d, Though, from the age of this person, being above sixty, it was natural to infer that there might be morbid degeneration of the arterial tunics from atheromatous, calcareous, or steatomatous deposition, yet, with this single exception, namely, his age, there was no other symptom or appearance indicative of the existence of such change. Moreover, it is well known that the operation for aneurism has often succeeded at very advanced periods of life.

3d, The absence of an aneurismal diathesis. As to the augmented strength of pulsations in the opposite subclavian and carotid arteries, it is a symptom too often met with in cases of aneurism to be particularly insisted on, in so far, at least, as it is not at all decisive of the existence of dilatation. In short, the presence of such a symptom is altogether deceptive in this respect. "I have seen every artery in the body that could be observed," says Mr Guthrie, "bounding and vibrating in such a manner in a patient who had femoral aneurism, as actually to raise the bed-clothes when they were loosely applied to any surface immediately over them."

The late Mr Todd, of Dublin, mentioned to Mr Guthrie, that, in a similar case, of a patient with popliteal aneurism, he had performed the usual operation, and cured both the aneurism and the deranged action of the heart and arteries.

4th, The perfect state of the collateral circulation, to the maintenance of the vitality of the limb, after the application of a ligature. Had the tumour been so large as to have led to the supposition, that the principal collateral channels were obliterated, the circumstance would have afforded, in my opinion, an objection to the operation in the case under consideration.

Speaking of this subject, Mr Hodgson says, that, whatever the size of the tumour is, it should not be allowed to preclude the operation; for many pounds of coagulum have been absorbed from aneurismal sacs after the operation. Though the great size of a tumour, particularly when taken with other circumstances, forms a valid ground of objection to the operation, yet, when taken singly, it should and ought not to have such weight.

5th, The absence of any elevation or displacement of the clavicle, the presence of which would necessarily have impeded, and rendered difficult the different steps of the operation.

6th, The general good health of the individual, he having left off working only three weeks prior to his admission into the hospital, in consequence of pain in the affected limb.

7th, The firm determination of the patient himself to have the operation performed. This of itself, however, ought in no case to justify the performance of an operation, and only deserves consideration when viewed in connection with other circumstances. In reference to this point, it may be mentioned, that the subject of the present case, being a person of considerable natural shrewdness and intelligence, was perfectly aware of the nature of his disease, and of the dangers and difficulties of the operation proposed for its cure, and of the difference of opinion which existed as to the propriety of undertaking such operation. After these and other particulars had been repeatedly and fully explained to him, he was, nevertheless, resolved to have the operation performed. Indeed, so firmly fixed was he in his determination in this respect, that, after having been nearly a month in the hospital, he had left it, a few days previous to my taking charge, in order to go elsewhere to have it done.

8th, The disease originated above the clavicle, and seems to have extended downwards. No greater error, indeed, can be committed than to neglect the operation at an early period of the disease.

The cause of death was the effusion of serum on the surface and into the cavities of the brain. This was, doubtless, occasioned by the disturbed state of the circulation, consequent to the operation. It is an effect, the occurrence of which cannot be estimated previous to an operation such as that for aneurism; for it may follow its performance in the most favourable case. This person's death, therefore, ought not in justice to militate against the propriety of the operation.

The vomiting and drowsiness were indicative of a cephalic tendency. Nothing could be more striking than the effect produced by the cold applications to the head on the first accession of stupor. Though no inflammation of the veins was discovered to account for the occurrence of the purulent deposits in the situation of the wound, yet I am disposed to think that it may have elsewhere existed. The symptoms which manifested themselves, however, during his last illness were not of this description. The preparation of the aneurism satisfactorily shows the disease to have originated in the dilatation of the whole circumference of the vessel. The circumstance of organized lymph being found deposited in the situation of the small pouches, and nowhere else, seems to strengthen the opinion entertained by some authors, that destruction of the internal coat is essential to its formation. The form of the aneurism, was irregularly pyriform, its particular shape being, as in all other cases, chiefly dependent on the resistence of the surrounding parts. In this way may be explained the two prominences on either side of the median nerve, and the flattened surface of the sac towards the chest.

II. Neil M'Donald, aged 30, admitted 30th July 1832, at eight o'clock P. M. having been brought in a steam-boat, a distance of fifty miles, during that day.

Over the belly and along the inner side of the biceps muscle of the right arm, is a soft, pulsating swelling, which extends from the lower part of the axilla two-thirds down the arm. Its expansion and diminution are synchronous with the action of the heart. The entire arm, from the shoulder to the fingers, is of a dark red-colour, much swollen, and pits deeply on pressure. He has a numb feeling in the arm, and the pulse at the wrist is exceedingly feeble. On the fore-part, but rather to the outside of the elbow joint, is a sloughy sore, whose surface is occupied by a dark clot of blood, the size of a large orange. Over the surface of the aneurismal tumour are four irregular superficial irritable looking sores, the largest being about the size of a shilling. His features are shrunk, and expressive of great anxiety; the breathing is hurried and oppressed; the pulse at the opposite wrist upwards of 130. The extremities are cold, and the skin over the whole body is pale and cadaverous, and covered with a clammy moisture. The tongue is furred, and the patient is thirsty.

The history of the case is the following. While blasting a rock, three weeks ago, the charge exploded when he was very near it, and in consequence he sustained a severe contusion and laceration of the soft parts on the inner and fore-part of the right arm. The radial artery was wounded at its origin, and he is said to have lost, at the time, a great quantity of blood. Both ends of the vessel were secured, and the arm dressed by a surgeon, four hours after the accident. The wounds had all nearly united, with the exception of that at the bend of the arm, which degenerated into a foul ill-looking sore. In other respects he continued to do well, till seven days ago, when, after slight exertion of the arm, hemorrhage took place from the artery which had been wounded,—the ligatures having come away a week previously. On attempting, at this time, to tie the artery, the wound was found in such a sloughy state, that the ligature could not be retained. A compress and bandage were therefore used, but without effectually preventing the bleeding, which has continued to recur at intervals since. He is said to have lost in all, from the time of the accident, nearly ℔ xii. of blood. It may be mentioned as a cause of the great swelling of the arm, that a tourniquet had been kept applied round it, for several hours previous to admission, hemorrhage having then taken place to a considerable extent.

Heat having been somewhat restored to the surface of the body, by means of frictions, and the application of warm cloths to the feet, with about ℥ ij. of brandy, in the form of toddy, internally, the axillary artery was, agreeably to the advice of a consultation, secured at the upper part of its lower third, about three-quarters of an hour after admission. On the ligature being tied, the pulsation in the aneurismal swelling ceased, and shortly after the temperature of the affected arm fell to 70° of Fahrenheit, that of the opposite arm being 86°.

After the operation, during which he was not removed from bed, he had an opiate, and in consequence passed an exceedingly good night, and, on the following day (31st) expressed himself as in every way comfortable. A flannel Scultetus' bandage had been kept applied to the arm, which is reported to be of its natural heat. Pulse 116. Ordered *castor-oil, camphorated dressings to ulcer at the bend of the arm, and simple ointment to others.*

1st August. A good night. Sensation of arm natural all over, and has felt occasional slight pricking pains through it to-day. Swelling of arm fast diminishing, and more particularly aneurismal swelling, which is now fully a third less than before the operation. Pulse 108; tongue cleaning.

7th. Has daily improved since last report, the pulse being steadily about 90, and of tolerable strength. Swelling of arm greatly less; pulse at wrist not yet perceptible; bowels, appetite, and other functions natural; sore on fore-part of elbow joint begins to granulate, slough having come away two days ago.

On the 14th, up to which period he continued to do well, he is reported to be affected with pain, redness, and swelling immediately above the external condyle. Several small pieces of whinstone had at different times, within the few preceding days, been discharged from the sores, along the inner side of the arm. The following is the rest of that day's report:—

"Rather a large piece can be felt under the integuments externally to the insertion of the deltoid muscle. The sore on the fore-part of the elbow is now clean, and discharging healthy matter. The ligature of the artery came away on the 9th. Still no return of pulse, however, at wrist, either on radial or ulnar side. A superficial sore, the size of a shilling, over the inner condyle, the integuments having given way from pressure; pulse 76, perfectly regular; tongue quite clean; functions natural.

"*Let the pressure be taken off by means of a heel-pillow placed under the inner condyle; to have a generous diet.*"

16th. This morning the lower part of the aneurismal sac gave way, when ℥ij. of bloody serum escaped; otherwise much in the same state as on the 14th. *A compress to be laid over the aneurismal sac, and supported by a moderately tight bandage, from the fingers upwards.*

2d Sept. 2 o'clock P. M. On the morning of the 30th ult. arterial hemorrhage to the extent of about ℥xx. took place from the aneurismal sac. This was arrested by compression above the clavicle, in the first instance, and by pressure kept up afterwards over the sac, by means of a pretty large compress and a Scultetus' bandage.

The bleeding having returned yesterday morning to 6 oz. and again in the evening to 8 oz., amputation at the shoulder-joint, by the advice of a consultation, was performed about ten o'clock P. M. by the double flap, after the method recommended by Baron Larrey.

Compression of the artery above the clavicle, by means of the handle of a screw tourniquet well padded with charpee, had very little, if any, effect in preventing the hemorrhage during the making of the flaps. Though this part of the operation did not occupy more than a minute, yet he may be said to have lost about ℥xx. of blood, the greater part of which occurred in forming the outer flap. Each flap on being made was firmly grasped by the hand of an assistant, which had the effect of completely arresting the flow of blood.

Disarticulation of the head of the humerus was scarcely completed when he fainted. He continued pulseless for nearly four minutes, during which time the respiration was not audible to those around him. In short, he was considered by all present at the operation to be dead. *Aqua ammon.* was held to the nostrils, and a little rubbed on the upper lip and temples, with frictions over the lower and fore part of the chest, and so soon as he could swallow, brandy to the extent of ℥iij., mixed with a little warm water, was given at different times.

The tube of the axillary artery being perfectly obliterated with yellowish organized lymph, required no ligature, but branches of the supra-spinal, circumflex, and subscapular were secured.

On being put to bed, had a draught, with twenty drops of *Sulph. Æther*, and ʒss. of *Tinct. Opii*, and the brandy toddy was ordered to be continued. He remained weak and very much depressed, till half-past three o'clock in the morning, when he vomited nearly a chopin of liquid, and immediately thereon rallied and fell into a sound and refreshing sleep. The pulse, when it could be numbered, shortly after the operation, was above 120, but it has now fallen to 96. The tongue is moist. Upon the whole feels tolerably well, though exceedingly weak.—*The brandy to be continued if necessary.*

3d. Occasional retching during yesterday afternoon till nine o'clock in the evening, when, in addition to the sinapism to the *epigastrium*, the draught was repeated, and he has, in consequence, enjoyed a good night's rest, with no return of retching since. Pulse in the evening upwards of 120, with a disagreeable jarring feel. This, though less, still continues, and the pulse is now down to 100. Tongue dry in centre, moist and clean around margins; considerable thirst; heat of skin rather increased; no stool since mid-day yesterday, but previously bowels easy.—*Vespere, si opus, Immitt. enema domest. et postea repetatur haustus; mane sumat. pulv. ex Rhei* ʒss. *Carb. Sodæ* gr. x. *et Zingib.* gr. iij.

5th. No return of bad symptoms; tongue cleaning; pulse 94, still with slight jerk; skin pleasantly warm; dressings removed for first time to day, and edges of flaps, over whole extent, adherent. On slight pressure being made, about ℥ij. of purulent matter escaped through an aperture the size of a pea, situate near the middle of the line of union. *Vini* ℥iv. *indies.*

6th. A considerable quantity of matter discharged on pressure from the opening mentioned yesterday. The rest of the wound is firmly united. The pulse is 90, with little if any jerk. *Compress and bandage to stump.*

From this period the cure went on slowly; the discharge daily diminished, with a gradual and corresponding improvement of strength, and other symptoms.

It was upwards of a month before the discharge finally ceased, and he was dismissed well early in November; the cure having been much protracted by an attack of bowel complaint.

Examination of the Amputated arm.—The aneurismal sac, rather larger than a hen's egg, was situate about three inches from where the arm had been removed at the joint. Its parietes, partly destroyed by ulceration, and otherwise exceedingly thin, were formed of condensed cellular substance. It burrowed under the biceps in front of the bone, and had produced great wasting of the inner half of that muscle. The brachial artery was impervious from the line of incision to within half an inch of the upper end of the sac, its canal being filled with organized lymph, in the same way as that of the axillary artery. The artery was destroyed nearly the whole length of the sac. From the disorganised state of the parts in the vicinity of the sac, it could not be well ascertained what particular vessel or vessels furnished the hemorrhage. One small artery, however, about the size of a stocking-wire, was found to open into the sac near its middle on the inside, and running directly from the cut surface. The cellular substance of the arm was very much infiltrated with serum. The brachial artery below the sac was pervious, though greatly diminished in size. The radial artery was obliterated near its origin.

The foregoing case is an example of circumscribed traumatic or false aneurism, complicated with impending gangrene of the arm. Many circumstances connected with it are worthy of remark.

On the patient's admission, the first question for consideration was, whether to amputate at the shoulder-joint, or to secure the axillary artery? The extent of the aneurismal swelling, the great tumefaction, &c. of the whole arm, and the previous injury of the radial artery near its origin, may be stated as arguments for amputation. On the other hand, as the return of pulsation at the wrist showed the collateral circulation to be perfectly established, it was therefore inferred, that securing the axillary artery by ligature, while it effectually obstructed the passage of the blood into the aneurismal swelling, would not, at least materially, endanger the vitality of the limb. Besides, the great quantity of blood that the patient had previously lost, taken in connection with his very depressed state, was strongly corroborative of the propriety of the opinion to attempt to save, rather than at once to remove, the limb.

The subsequent progress of the case, for a time at least, sufficiently justified the measure. For nearly a month after the operation, there was every reason to expect a favourable issue, and but for the ulceration of the sac, in the first instance, and the occurrence of hemorrhage afterwards, there is every reason to suppose that this person's arm would have been saved.

Of the propriety of amputation, at this period, there can be little question, more particularly when contrasted with the other modes of treatment that might have been had recourse to in such a case, namely, either to have cut down and tied the artery above or below where it had been formerly secured; to have opened the sac, as in the old operation, and secured both ends of the vessel, or to have used compression of the whole limb, with firm pressure over the sac. Had the Hunterian operation for aneurism been had recourse to a second time, the hemorrhage, in all probability, would soon have recurred from the direct flow of blood, by the already enlarged collateral channels, into the sac itself, or the main artery before entering it. Under such circumstances, then, the bleeding would merely have been prevented for a few days at most, and hence it would have occasioned delay in the performance of that operation, which sooner or later was likely to be imperatively called for.

Besides, it is well known that secondary bleeding very frequently takes place from the inferior portion of the artery. Now, to have commanded this, would have required the separate operation of cutting down and securing it, as in cases of wounded artery. This, however, was altogether out of the question, from the previous great extent of the aneurism, and the nature of the accident giving rise to it. As to compression, the evident destruction of a considerable extent of the artery, the thinness of the aneurismal sac, and its having given way at one part, together with the previous state of the limb, was evidence sufficient to contraindicate its use. All things considered, therefore, amputation was the only resource left. That it ought unquestionably to have been performed at a more early period, I am willing to admit; say, on the first occurrence of the bleeding, or, at furthest, immediately after its recurrence. When amputation, for example, is rendered indispensable in any case, from the urgency or incurability of the disease, to delay doing so, except upon proper grounds, is unequivocally the worst fault that can be committed. But, if such be allowed, generally speaking, to be bad practice, pray, what must it be when the operation is called for under the circumstance of dangerous hemorrhage, and that, too, in a person already much reduced by previous disease.

The case is quite different from one of hemorrhage occurring in consequence of the sac ulcerating at a remote period after a wound of an artery, unattended by destruction of the soft parts, for in such a case, the proper treatment would consist in opening the sac and securing both ends of the artery, instead of performing either the Hunterian operation or that of Anel.

There is nothing worthy of remark in the operation. It was performed in the usual way by making two equal flaps. Although not an unfrequent witness to scenes of blood, yet I have never seen one so very appalling in its character, as took place in the operation under review. The sudden gush which ensued on making the outer flaps was profuse in the extreme. It issued from innumerable points, showing satisfactorily great enlargement of the collateral vessels,—the principal trunk being obliterated. I was much indebted to the gentlemen who assisted me for instantly seizing hold of the flaps singly, and compressing them firmly with the folded hand, otherwise, I should certainly not have been able at the time to have proceeded to complete the operation. Pressure above the clavicle had no effect whatever over the hemorrhage; and I am of opinion, from the state of the collateral circulation, that even had the subclavian artery been previously tied, a step which I should never certainly think of adopting, it would have had nearly as little.

Though the margins of the flaps presented, on the fourth day, an even line of union which did not afterwards separate, yet subsequently both a profuse and tedious suppuration ensued. This is explained by two circumstances; 1*st*, The great depth of the glenoid cavity from the projection of the acromion and humeral end of the clavicle, which prevented the surfaces of the flaps from coming in contact with it. 2*d*, The presence of the articular cartilage of the glenoid cavity, which by some authors is considered to act as a foreign body, preventing union in the first instance, and afterwards keeping up suppuration. I should be disposed, therefore, in a similar case, to use the precaution of excising part of the acromion, and of stripping the glenoid cavity of its articular cartilage.

The following interesting case was shown to me in consultation, along with several members of the profession in this society. For its particulars I am indebted to Mr Thomas Gray, through whose kindness I had an opportunity of seeing the person frequently during his lifetime, and also of being present at the *post mortem* examination of his body. The preparation of the aneurism is in my possession.

III. 19th April 1834. A. B., aged 64, slender made, and about the middle size, but generally healthy; by trade a plumber, much exposed to transitions of temperature, and frequently in the habit of carrying heavy loads of lead on his shoulders.

At the lower and anterior part of the neck, immediately behind the right sterno-clavicular articulation, is a strong pulsating tumour, of a spherical shape, and somewhat larger than an ordinary sized hen's egg. It extends in the course of the carotid artery, and of the subclavian to the inner edge of the scaleni, these two vessels, with the *innominata*, being involved in the affection. Its pulsations correspond with the action of the heart.

The subclavian artery seems to be obliterated in the middle division of its course, as it passes between the scaleni, there being no pulsation perceptible on the acromial side of these muscles in the axilla, nor anywhere down the arm. In other respects, however, the extremity feels natural, though affected with slight numbness and frequent shooting pains. At each expansion of the tumour, there is a corresponding elevation of the integuments in the triangular space between the sterno-mastoid and trapezius muscles,—a pulsatory motion being thus communicated from the one part to the other. The tumour is rather firm, slightly painful to pressure, but not discoloured. His general health is rather impaired. Frequent dry tickling cough, with scanty expectoration; some anxiety of countenance; hoarseness of voice; and dyspnœa preventing sound sleep.

In April 1833, he became affected with pain in the right shoulder, which he considered rheumatic, having been frequently at previous periods subject to attacks of rheumatism. Much about the same time, a movable tumour, about the size of a Spanish nut, appeared above the clavicle, near to the sterno-clavicular articulation. This, as it occasioned but little, if any, uneasiness, was deemed by him a simple enlarged gland. In October following, he fell from a scaffolding two stories high, and alighting on his feet sprained the right ancle. Though he suffered no other external injury, yet the jerk which he sustained by the fall, he says, was very considerable. From this period the tumour and pain in the shoulder increased, the former in size and the latter in severity. He has not been able to resume his employment since. On applying to Mr Gray for advice, eight weeks ago, he was for the first time made aware of the nature of his disease. At that time, the tumour was little more than half its present size, and pulsated. The pulse at the wrist, though very weak, could be felt.

The object of the consultation was to determine whether or not it would be expedient to recommend any operation, namely, either that of applying a ligature to the *innominata* between the seat of the disease and the aorta, or tying the carotid on the distal side of the tumour. It appeared from the history of the case, that the disease had commenced near the origin, either of the subclavian or the carotid artery; if not at the bifurcation of the *innominata* itself, and that subsequently it had extended inwards towards the chest, as well as outwards along the neck. The uncertainty of the extent of the disease in the *innominata*, therefore, was quite sufficient to preclude the propriety of tying that vessel. The other operation was considered too doubtful and dangerous an expedient to be had recourse to. Such an operation, it it generally allowed, is fully more likely to be productive of bad than of good effects, particularly when the disease is seated so near to the heart as the innominata. He was in consequence dissuaded from any operation, with injunctions to live low, and to abstain from much exercise.

In the course of the following month, he went into the country, where he resided about eight weeks, by which he was very much benefited. On his return, in the middle of August, the tumour had much the same appearance, but from this period, it was observed to increase gradually in size.

On the 20th October the following is the report,—" Tumour one-half larger; trachea pressed a little to the left side; sterno-mastoid very much on the stretch; and complains of great pain darting from before ear, and contending along half side of head and face. This is most troublesome when he turns his head, and is generally much relieved by inclining it towards the right shoulder. He is unable to sit in the erect posture more than fifteen minutes at a time, from a feeling of giddiness and fainting; and he has troublesome tickling cough with slight dyspnœa, preventing sleep."

Early in January it had attained the size of a goose's egg, and measured four inches and a-half by three in its shorter diameter. Complained much of pain over the upper end of the sternum and inner half of the clavicle. The tumour immediately above the hollow of the sternum felt firm and more painful than formerly. The hemicrania was now exceedingly distressing, and almost wholly prevented him from getting any sleep, notwithstanding the free use of opium.

By the beginning of June, it was fully one-half larger than a child's head at birth. It occupied the entire right side of the neck, from the clavicle and sternum to the lower margin of the jaw. It encroached also considerably on the left side, the larynx and trachea being pushed nearly two inches to that side. About this time the integuments began to point, in the form of a projection the size of the nipple, at the most prominent part of the swelling, two and a-half inches below the chin, and a little to the right side. In less than a week after, an exactly similar projection took place an inch farther back; and in the course of a few days more a third occurred, about midway between the two former, but higher up, being an inch nearer to the maxilla. At length the whole coalescing formed a conical shaped projection larger than an egg, with three nipple-like processes on its surface. The integuments covering it were exceedingly thin, tense, and of a dark-red colour, and for several days previous to his death had every appearance as if about to burst. This, however, did not take place. He died suddenly on the 20th June, in the effort of raising himself forwards to facilitate expectoration of mucus. Almost immediately after his death, the aneurismal swelling began to subside, and in the course of less than an hour the cyst was empty, presenting a great hollow depression, with thickening around its circumference, particularly at the lower part.

Inspection.—For the purpose of having a cast taken of the tumour, the cyst had to be opened in the situation of the projection and the whole stuffed.* On reflecting the integuments with the fascia and platysma myoides, the sterno-mastoid, very much stretched, was pushed to the right side, and partly spread over that portion of the circumference of the tumour. The posterior aspect of the aneurism was close to the surface of the spine, burrowing under the larynx and trachea, which were pressed fully more than two inches to the left side. The sterno-hyoid and thyroid muscles were stretched and spread over the corresponding surface of the tumour. On removing the different parts with the sternum and inner half of the clavicle, the disease was found to affect the two upper thirds of the *innominata*, the whole length of the carotid to its bifurcation, and the subclavian to the inner edge of the *scaleni*.

The dilatation involved the whole circumference of the carotid and subclavian arteries. This was illustrated in both, but more particularly at the bifurcation of the former, where the vessel was about twice the thickness of the thumb, and quite circular. The *innominata*, however, was affected only in the anterior half of its circumference; the posterior half, though enlarged, was quite flat, and otherwise appeared natural. That portion of the cyst formed by the dilated carotid was exceedingly thin, and little more than a line in thickness at its anterior part. The smooth lining could be distinctly traced all over the inner surface.

The posterior surfaces of the upper end of the sternum and inner half of the clavicle were partly absorbed, with destruction of the corresponding part of the cyst anteriorly. In this situation there was a considerable deposition of lamellated coagulum. There was little elsewhere, except at the circumference of the cyst towards the larynx and trachea. The inner lining was continuous to the place where the cyst had been adherent to the sternum and clavicle. The subclavian was obliterated to the extent of the breadth of the *scaleni*, where it was so completely incorporated with these muscles as to form apparently one structure. The innominata below the seat of the disease, as also the aorta, was greatly enlarged. Their coats, though thicker than natural, presented but little of atheromatous or calcareous deposit. The upper lobe of the right lung was adherent to the lower and posterior part of the *innominata.* Considerable effusion on both sides of the chest. The *bronchi* contained much puriform mucus, and the inner lining was very red.

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* I am indebted to my friend Mr Allan Burns for two coloured casts of this case; one showing the magnitude and appearance of the aneurism externally previous to the inspection of the body, and the other the different parts displaced by its pressure.

An operation having been considered inadmissible in the preceding case, the treatment was altogether palliative, it has been proposed by Mr Wardrop under similar circumstances, 1*st*, To tie the carotid, and, then, if necessary the subclavian. It may be asked, therefore, why this was not had recourse to in the present instance, more particularly as the subclavian artery was already obliterated? This operation, usually styled Brasdor's, is founded on two fundamental principles: 1*st*, That the diminution merely of the momentum of blood in an aneurism, when effected to a certain extent, will be followed by coagulation of the blood, and by obliteration of the sac and artery; and, 2*d*, that a diminution of momentum may be accomplished by a ligature beyond the tumour, and sometimes to the required extent.

Of the truth of the former of these principles there cannot be a doubt; for in a great many instances subsequent to the Hunterian operation, the blood has access to the aneurismal sac, but with a lessened impulse; and yet, generally speaking, perfect obliteration is found to follow. As to the correctness of the latter principle, however, many writers have expressed their doubts, though, as appears to me, without just cause, their objections being founded more upon special a *priori* reasoning than upon actual observation. For example, it is well known, that if a fluid be conducted by a common trunk through numerous ramifications, with a certain degree of force, and one of these ramifications be suddenly obstructed, the quantity of the fluid is immediately increased in all the pervious tubes; satisfactorily showing that the additional pressure produced is not solely sustained by the obstructed tube, but is distributed over the different branches. This observation is amply confirmed by what takes place on the application of ligatures to divided arteries; for under such circumstances the blood is thrown upon the collateral channels, which, by an invariable law in the animal ecconomy, gradually thereafter enlarge, for the adequate maintenance of the vitality of the parts beyond the seat of obstruction. Obliteration of the tube, in the great majority of cases, follows from the point at which the ligature has been applied up to or near the first collateral branch. The *cul de sac* or end of the artery never dilates or becomes aneurismal, unless the coats of the artery be diseased.

It is not upon the mere coagulation of the contents of the sac, however, that a cure of the disease depends, but chiefly upon the production of inflammation in the sac itself, by which a deposition of adhesive matter takes place on its inner surface, forming what is styled the lamellated coagulum. Now, as this is an operation which is only justifiable when the aneurism is so near to the great cavities of the body as to preclude the propriety of having recourse to the Hunterian operation, the inflammation thus excited by the ligature is likely to be propagated, not only to the sac, but to the internal tissues and organs of the thorax and abdomen. The danger of such an occurrence is greatly increased by the fact, that aneurisms near the origin of the large ramifications of the *aorta* are but symptoms of previous organic disease of the coats of the arteries; so that any additional irritation will often be productive of the most unfortunate results. Moreover, the operation is liable to the same objections as Anel's, namely, that the ligature must be applied near to the seat of disease, and of course to an unsound artery. Hence the great danger of secondary hemorrhage from premature ulceration of the coats of the artery. Such an occurrence is by no means unlikely, judging from the history of the different cases on record in which the operation has been performed. The proximity of the ligature to the sac excites inordinate inflammation in the walls of the aneurism, so that instead of simple thickening and induration, we may have suppuration, ulceration, or sloughing of the sac taking place. Had the operation, therefore, been had recourse to, in this instance, from the immediate nearness of the disease to the heart, and the previously impaired state of the person's health, it may justly be inferred that it would have led to similar results.

Although it is contended by those who advocate the propriety of this operation, that coagulation may ensue on the application of the ligature, yet cases are related by Mr Guthrie and other writers, to prove that aneurisms have continued to increase to a fatal termination. notwithstanding the obliteration of the lower orifice of the artery, either spontaneously or by means of a ligature applied *ultrâ tumorem.*

It would seem necessary to the perfect success of the operation in question, that the blood within the aneurismal cavity be in a quiescent state, or, in other words, that no collateral vessel of any size be given off between the ligature and the disease, or from the sac itself; for in either case it is obvious, that a constant current of blood would be kept up, and thus the wished for coagulation be prevented, or, at least, very much impeded. In reference to this point, it may be asked, would the current of circulation through the enlarged collateral vessels, arising from the sac and proceeding to the upper extremity, as in the foregoing case, have had such an effect? I should be disposed to answer in the affirmative.

The obliteration and consolidation of the subclavian artery as it passes between the *scaleni*, was occasioned by the aneurism overlapping the edge of these muscles, so as to keep the inner surface of the vessel constantly in contact. As the internal coat of an artery makes an approach in character to serous membrane, the circumstance affords an explanation how it should so readily unite, when the surface is kept in apposition, just in the same way as the continued pressure of the pad of a truss not unfrequently effects closure of the mouth and neck of a hernial sac.

Sir A. Cooper and Mr Liston relate nearly similar cases.

The canal of the artery being quite pervious on the outer side of the *scaleni*, demonstrates satisfactorily that the blood had regained the original main trunk, having been conveyed thither by the enlarged collateral channels arising in all probability from the sac. The absence of pulsation, therefore, is alone explicable by the blood, in its passage through the aneurismal dilatation and collateral vessels, losing the impetus communicated to it by the contraction of the left ventricle of the heart.

The immediate subsidence of the aneurismal swelling after death,—a circumstance which led to the notion of rupture having taken place internally, is to be explained by the fluid contents of the sac receding towards the aorta, and from it passing readily into the larger vessels of the chest and abdomen.

The severe hemicranial pain which he experienced for many months previous to death, and which he said was the most distressing symptom attendant on the disease, is to be explained by the overstretching of the sterno-mastoid muscle, and the consequent pressure made on the spinal accessory and descending branches of the *portio dura.*

Glasgow, *4th Feb.* 1836.

Art. IV.—*Notes on some of the Disorders of Menstruation.* By F. Churchill, M. D. Physician to the Western Lying-in Hospital, and to the Wellesley Female Institution, Lecturer on Midwifery, with Diseases of Women and Children, in the Richmond School of Medicine, Dublin.

It is not my intention to enter into much detail on the general history of these disorders, which have been fully and ably treated by various authors, but merely to offer a few observations on some varieties, which they appear to have somewhat overlooked; and although, for the sake of distinctness, I shall adopt the usual division into *amenorrhœa*, *dysmenorrhœa* and *menorrhagia*, I would premise, that in practice so nice a distinction is by no means always admissible. There frequently seem cases which, so far as amount of pain is concerned, belong to the second class, but in which the scantiness of the secretion would seem to place in the first. In like manner *menorrhagia* is often attended by very acute suffering both previous to and during the secretion. Attentive observation will obviate the danger of any mistake arising from these complications. A much more probable source of error in our investigations arises from the delicate nature of the subject. Both parties are anxious to pass it by with the least possible detail, and frequently an assertion of *regularity* is made when further inquiry would detect *irregularity* in all the circumstances, except, perhaps, in the periodical appearance of the discharge. It should never be forgotten, that variations in the quality and quantity of the excretion are as important, and require as much attention as any other peculiarity.

I. *Amenorrhœa* has usually been divided into two species,—true *amenorrhœa*, when the menses have not as yet appeared, and *amenorrhœa suppressa* when, having appeared more or less regularly, they are suddenly arrested. As to the period in the first species when the absence of the excretion may be considered a morbid condition, it varies not only in different countries, but very much in our own also. Although many cases present themselves of menstruation at 12, yet, speaking generally, it occurs most frequently between the ages of 14 and 18, or it may be delayed until the age of 20, without any appreciable morbid cause. Our judgment, in fact, must be formed upon a careful estimate of the developement of other organs and their functions, with the state of the uterine system.

The first appearance of the *menses* is looked for with great anxiety by all females, from a popular prejudice that this is of far greater importance than their subsequent recurrence. Writers on this subject seem generally disposed to take the opposite side of the question, and to regard with too little care the establishment of this function. This has led them to overlook an occurrence which frequently takes place, and has often given rise to an error in practice. About the age when menstruation should occur, we repeatedly observe all the symptoms which usually accompany it, such as languor, headach, weight and aching about the loins; yet the courses do not appear, and this may continue some months. But if we inquire more minutely we shall find that the *uterus* at these times is not inactive, but that, instead of excreting a red fluid, a white fluid is discharged. Now if this be overlooked we shall probably, if the general developement seem to justify it, proceed to act upon the *uterus* by its proper stimulants, or upon the constitution generally, as in true *amenorrhœa*. The cases are, however, very different. In the latter the *uterus* is quiescent; whilst in the former it is not only disposed to fulfil its proper function, but is actually in a state of activity, although, from some cause or other, yielding a morbid product instead of a healthy one, and the treatment of each must be different accordingly. This discharge of whites preceding the eruption of the menses may occur but once or twice before that function is fully established, or it may continue for a long time at regular monthly periods, with perfect intervals between each. This, however, is rather rare. It is more common in these latter cases to have more or less of the *uterine leucorrhœa* during the intervals. In the former cases it may be regarded as merely vicarious of the menses, but in the latter it indicates a morbid condition of the *uterus* or of its lining membrane, and becomes in its turn a cause of *amenorrhœa.* The symptoms in the former case are very slight, scarcely differing at all from those which accompany the usual periodical discharge, whilst in the latter they are much more severe, and the constitution soon sympathizes with the local disorder. There is constant weakness of the loins, with occasional pain in the side or chest, frequent headachs, loss of appetite, irregularity of bowels, paleness or sullenness of complexion, languor, and indisposition to exertion, &c.—the symptoms, in short, of uterine *amenorrhœa.* In all cases of *amenorrhœa* of the first species, then, we should be careful to ascertain, not merely that the red discharge has not appeared, but that there is no uterine excretion at all, before we treat the patient in the manner usually recommended.

Again, in *amenorrhœa suppressa,* we often find the patient's health unaffected for some months,—none of the secondary symptoms which usually follow a sudden arrest of that excretion having followed. In these cases likewise a discharge of whites usually takes the place of the healthy product, causing little apparent detriment so long as it is periodical, and does not continue during the intervals. When the uterine *leucorrhœa* is persistent, then we shall have the usual symptoms sooner or later, and all our efforts to restore the healthy functions of the womb will be fruitless, until this disease is cured. There are some cases which occupy a middle place between the two classes just described. The patient commences menstruation probably about the usual period, and after going on regularly for a year or two, finds the quantity diminished occasionally, and without any apparent cause. After this has occurred two or three times, she first perceives that, although the red discharge has ceased, yet a white fluid continues to flow for some time. By-and-bye she observes this make its appearance a day or two *previous* to the catamenial discharge, which perhaps becomes somewhat irregular as to time. This state of matters may go on for some time, the patient becoming gradually more delicate in health, losing her appetite and strength, and becoming low-spirited, until the *catamenia* miss a period altogether, their place being supplied by a discharge of whites to about the same amount. After this, she will sometimes menstruate properly; at others the uterine *leucorrhœa* will appear until the latter discharge becomes completely vicarious of the former, and often persists during the interval also. If we examine this patient we find her with the appearance of incipient *phthisis* or *chlorosis*. Her appetite is fastidious or nearly gone, she complains of great languor and indisposition to exertion; the flesh is soft and flabby; the skin sallow, loose and moist; the tongue probably clean; the bowels generally confined; the pulse about the natural frequency, but small and compressible, with occasional severe attacks of headach, constant aching in the lower part of the back, and pain in the left side.

The *pathology* of these varieties of *amenorrhœa* is somewhat obscure. The uterine *leucorrhœa* may arise from deficient secretive power, or from want of materials for elimination; it may be a morbid secretion, or the result of appreciable chronic inflammation of the lining membrane of the *uterus*. The age of the patient, her previous history as to menstruation, and the general symptoms, will be our best guides to a decision of the question. The causes are very various; sedentary occupations, deficient food, cold taken during menstruation, abortion and excessive coition, have each apparently given rise to it. Mental anxiety and distress always increase it, and sometimes seem to have some share in its production. I have frequently seen cases of flooding or puerperal fever after delivery, in which the *menses* have been absent some months subsequently.

Some of the organic diseases of the *uterus* which do not affect the lining membrane interfere with this function. *Amenorhœa* gradually supervened in two cases of fibrous tumour of the *fundus* which I had under my care.

Several of the secondary symptoms and diseases consequent upon the arrest of the menses are deserving of a brief notice. The action of the heart is often considerably disturbed. Irregularity of action and violent palpitation recurring at intervals, and disappearing with the removal of the cause, is probably the most common form. My friend Dr Greene, whose accuracy of diagnosis is well known, has mentioned to me several cases in which he heard well-marked *bruit de soufflet*, without a trace of organic disease, or of any cause but this one of *amenorrhœa*, and which ceased as soon as menstruation was restored. Effusion into the abdominal cavity may often be observed to follow suppression of the menses, and sometimes general anasarca. In some of these cases uterine *leucorrhœa* is present, in others absent. Absorption of the fluid takes place when the catamenia reappear.

Treatment.—As far as my experience goes, I have found those cases of *amenorrhœa* which are complicated with uterine *leucorrhœa* more manageable than the more simple ones, and for this reason, that in most of them the *amenorrhœa* is consecutive to the *leucorrhœa*, *i. e.* the state of the lining membrane of the *uterus* which gives rise to the latter is also the cause of the absence of the menses, and, therefore, in many cases, the cure of the "whites" is followed by menstruation without further interference. This observation does not apply, however, to those of the first class I have noticed, where there is no evidence of morbid action. In these cases there is, in fact, a right acting on the part of the *uterus*, but the "materiel" for elimination being deficient, the product is different.

And it is to this point that our attention must be directed,—in other words, the treatment must be mainly constitutional. Some tonic medicine may be given; one of the bitter infusions, or a preparation of iron suited to the state of the stomach, and repeated as often as the condition of the patient may demand. The diet should be nutritious but not stimulating. Purgative medicine will occasionally be necessary, and I have found aloes in combination with rhubarb the most efficient. Air and exercise are absolutely necessary, but care should be taken to avoid fatigue. A hip-bath or pediluvium should be used every night at the approach of the menstrual period. In some cases sea-bathing has been found beneficial during the interval.

These means have rarely failed me, and I have always found that, in proportion as I succeeded in invigorating the constitution, menstruation occurred and returned with more or less regularity. The patient, however, will be liable to miss a period occasionally. In the other cases where the "whites" are not merely vicarious of the menses, but continue through the interval, the treatment must be very different. They are in fact cases of uterine *leucorrhœa*, and must be treated as such. A blister should be applied to the *sacrum*, and repeated after some time. Balsam of copaiba, decoction of logwood, and pills composed of sulphate of iron gr. ½. blue pill gr. ii., and the compound rhubarb pill gr. iii., have all answered the purpose. Powdered colchicum seeds were recommended in a recent number of the American Journal of Medical Science. I prescribed them in one case, but without benefit: Should the local distress be great vaginal injections of warm water will be found useful. Tonic medicines may be given, and the bowels must be kept free. Country air is desirable; but exercise, unless taken very cautiously, will be found injurious; it almost always increases the uterine discharge. When the *leucorrhœa* has ceased, spunging the lower part of the body with cold water is decidedly beneficial. These means will generally be successful, but the patient will require great care at the next menstrual period, and we are not to be satisfied until "whites" neither precede nor follow the catamenia.

II. *Dysmenorrhœa.*—The distinctive mark of this disease is the severe pain occurring at each monthly period, and not the nature or quantity of the discharge, which may either be scanty, profuse, or to the usual amount. The character of the pain and the accompanying symptoms vary according to the constitution of the patient, and other circumstances, and the treatment required is often very different. For this reason I have been in the habit in my lectures of dividing the majority of cases into two classes, 1. the Neuralgic, and 2. the Inflammatory, without, however, denying that there are many instances which are not included, and some others which appear to border upon both. Neither do I intend to convey the impression, that there is no local change in the first species. It is true that the *os uteri* is enlarged by the afflux of blood during the flow of the menses, but by no means so much as in the second species, and the constitutional irritation in each differs still more considerably.

1. *Neuralgic Dysmenorrhœa* may attack females of all ages, but it is more generally seen after 35 than before. I have observed it more frequently in unmarried women, or in married women who have not born children, than in others. It is almost confined to those of a nervous temperament, and of a thin delicate habit. The monthly paroxysm presents all the characteristics of *neuralgia.* For a day or so previously there is a sense of general uneasiness, a feeling of cold, or, as a patient complained to me, the very bones of the extremities feel icy-cold. Headach may precede the appearance of the menses or succeed it; and I think the latter more frequent. The pain commences in the region of the sacrum, and extends round to the lower belly and down the thighs. In some cases it appears to come on in regular paroxysms with intervals of rest, in others it is constant. The amount of suffering of course varies much, and sometimes it is so acute as to occasion syncope, and to oblige the patient to keep her bed. In others it is confined to the few hours preceding and following the eruption of the catamenia. During the attack the pulse is not accelerated, and there is no feverishness, and subsequently the patient seems less reduced than one would naturally expect. The menses are generally scanty, and are very often altered in quantity, or mixed with small clots of blood. The membrane of plastic lymph described by Denman and succeeding writers is occasionally discharged; but I am unable to say whether it is more frequent in this species than in the next.

The attack varies in duration from twenty-four hours to four days; its acuteness then diminishes, and if not succeeded by severe sick headach, (as it invariably is in one patient of mine,) it rapidly passes over, and the patient resumes her usual routine of employment. Very little disturbance of the other functions is observed. The bowels are regular, and in some the appetite is scarcely affected.

2. *Inflammatory Dysmenorrhœa* differs widely from the species just described in the subjects of it, and in its symptoms. It occurs in females of a full habit and of a sanguine temperament, and generally at an earlier age. Unmarried women are especially liable to it, and married women who have had children also. Few precursory symptoms announce the attack; a degree of restlessness and feverishness, with rigor, and flushing, and probably a headach, precede the *catamenia* a few hours. For some hours after their appearance, the suffering is very acute, the patient complains of pain in the back, aching of the limbs, weariness, headach, intolerance of light and sound, the face is flushed, the skin hot, and the pulse full, bounding and quick, often upwards of 100. This state of things is not of very long continuance. All the symptoms are mitigated when the discharge is fully established, though the period at which this takes place varies much.

Should the fever run high, delirium sometimes comes on for a short time.

Uterine leucorrhoea is not unfrequently observed during the intervals, whereas in the former species I have scarcely ever met with it, at least to any extent.

The attack may recur with each menstrual period, but it does not persist so regularly as the former species, nor does it (at least when not very severe) as often prove an impediment to conception.

Pathology and Causes.—From an attentive observation and consideration of these cases, I have been led to the belief, that, in the first species, the disease is of a simple neuralgic character. We have no evidence of any inflammatory process going on; the pulse is feeble, and not quickened; the skin is cool, and the pain often recurs in paroxysms; whereas in the second species, the headach, flushed face, heat of skin, restlessness, and quick full pulse, all point to some inflammatory action. If we add to this the relief obtained in these cases by very opposite remedies, but little doubt will remain.

My friend Dr Mackintosh, in his Practice of Physic, has pointed out a morbid state of the *cervix*, as a not unfrequent cause of *dysmenorrhoea*. In a number of cases he discovered well-marked narrowing of the passage through the *cervix*, and his patients experienced great relief from dilatation by bougies. He does not, however, mention any symptom which clearly indicates that the suffering was caused by retention or difficult transmission of the menses, and it appears rather questionable whether the relief may not have arisen from the direct stimulation of the organ by the bougie. I am far from denying the existence of stricture, or that it might possibly cause pain in menstruating; but as I have found it absent in many severe cases, and in one in which I discovered and dilated it, no benefit was experienced, I am compelled to believe that it does not form a very important circumstance in the pathology of this disease.

Treatment.—I have already said that the treatment differs for the two species, and I may add, that the success of our remedies varies as much. The neuralgic variety often proves extremely obstinate, resisting every means we use, and persisting in spite of the best directed efforts even for years. Whereas it is not difficult to alleviate the attacks of inflammatory *Dysmenorrhoea*, if we cannot prevent their recurrence. Narcotics of course are the principal remedies against the former. Opium in grain doses may be given every second hour, commencing with the first sensation of pain in the back, and continued until relief be obtained. Camphor may be advantageously combined with it. If we fear the effects of opium upon the head, hyoscyamus or some of the preparations of morphia may be preferred. I have found more benefit, however, in severe cases, from opiate *enemata*, than from any other mode of exhibiting it, and in several cases the mitigation of the pain was immediately followed by increase of the *catamenia*. In one case, where all other remedies had failed, I ordered five grain doses of the ergot of rye to be taken three times a-day for two days previous to that on which the *menses* were expected to appear, and with decided benefit. The discharge was much increased in quantity, and little or no pain accompanied its excretion.

Warm drinks should be ordered, such as whey, thin gruel, or even a little port-wine negus.

I have found benefit also from the use of pediluvia at bed-time, one or two nights preceding menstruation.

The first indication in well-marked cases of inflammatory *Dysmenorrhœa* is very clear. With the full quick pulse, hot skin, flushed face and headach, there can be little hesitation in taking twelve or sixteen ounces of blood from the arm. Should the condition of the patient forbid general blood-letting, leeches should be substituted. The bowels should be freed by saline purgatives, and febrifuge medicines, with cooling drinks, exhibited. These means will generally suffice to relieve the prominent symptoms, and if any pain remains, a dose of calomel and opium at bed-time will probably relieve it.

I have tried tartar emetic, but I cannot say with any benefit.

But in this species our treatment is not confined to the menstrual period. During the interval the patient should take a good deal of exercise, and be much in the open air. Walking is preferable to riding or driving.

Brisk purgatives should be regularly administered, and on the approach of the monthly period, if symptoms of great excitement are observed, it will be well to take away a small quantity of blood.

By a steady and judicious use of these means, we shall rarely fail in mitigating the sufferings of our patient.

III. *Menorrhagia.*—This term is used by many writers to signify merely an increase in the menstrual evacuation; others include in it as well any discharge of blood or clots which may accompany or succeed the catamenia. This latter definition has been adopted by Dr Locock, in the article on this subject in the Cyclopedia of Practical Medicine, and it is probably the best, as avoiding undue multiplication of names, and leaving the term uterine hemorrhage to be applied exclusively to flooding, connected with pregnancy and parturition.

I have had occasion to notice three forms of the disease. In the first the discharge is natural, but the quantity or frequency of recurrence is greatly increased. In the second the discharge is large, and occasionally mixed with clots of blood. An examination of the *uterus* reveals no change in the condition of *cervix* or body. In the third there is a considerable loss of blood, with a marked change in the size and position of the *uterus.* As to the first variety, it occasionally sets in with a sudden and violent gush from the *vagina*, after which it stops for some hours and then recurs, and this alternation may continue during the usual period of menstruation. Sometimes the discharge goes on regularly, but lasts for ten days or a fortnight, or even three weeks; or the discharge being not unusual in quantity, it may return every two or three weeks; and this variety I have seen in very young unmarried females, as well as in those whose uterine system has been in a state of greater activity. It is probably more common than any I have noticed. It is also, more frequently than any of the others, connected with that state of the lining membrane which gives rise to uterine *leucorrhœa*, which occupies the interval between the two periods. In some cases, indeed, the *leucorrhœa* has been very evidently the cause of the *menorrhagia*, and when it succeeds the latter, it has always appeared to augment the severity of the attack. In the cases where the *menorrhagia* is constant, it will generally be found on inquiry that, at an earlier period, the patient was much subject to "whites."

The general *symptoms* are exactly what we might expect from the continuance of a debilitating discharge. Exhaustion, languor, and dislike of exertion, weakness across the loins and hips, paleness of the countenance and occasional headach, occur in the slighter cases, and at an early period. If the disease be not relieved, and especially if uterine *leucorrhœa* be present, all these symptoms assume greater severity. The exhaustion and languor increase; the face becomes sallow; an aching pain is felt across the loins, extending round the lower part of the *abdomen;* pain in the left side; repeated and severe headach; derangement of the stomach and bowels; in short, a complete derangement of the general health ensues. Nothing is discovered by internal examination; there is neither unnatural swelling of the *cervix* nor increase of heat; the *os uteri* is slightly open, but there is no tenderness. Among the more general causes of this disease, frequent child-bearing and over-suckling are perhaps the more frequent. The latter is often carried to a great extent amongst the poor, to prevent the too rapid increase of families, which it does most effectually when it gives rise to this disorder, but at the expence of much suffering and loss of health to the mother. In some cases it has been attributed to excessive flooding after child-birth, and in one patient of mine, where this was the case, the catamenia have ever since returned regularly every three weeks. Excessive coition sometimes causes, and always aggravates this disorder. Cold, over-exertion, mental emotion, &c. will also occasionally produce it.

In the severer cases, conception of course cannot take place; but I have repeatedly witnessed the contrary in the milder forms. It may or may not return afterwards. Its duration is very variable; the milder cases often get well spontaneously, and the severer may generally be cured by suitable treatment, although they are sometimes tedious.

There is nothing to excite the suspicion of any organic change in the womb, and therefore I suppose it must be regarded as a functional disorder merely. I have never seen in these cases any approach to the severer forms, which I shall describe presently.

Treatment.—Our first endeavour must be to remove the cause if possible. If it proceed from over-suckling, the child should be immediately weaned, and the patient should live, for some time at least, *absque marito.*

If the menses are too copious, a large dose of opium will sometimes reduce them to their proper quantity. Acetate of lead has sometimes been useful in combination with opium. Should these fail, ergot of rye may be given in small doses.

But in these cases, and in those where the menses recur in natural quantity, but too frequently, the period for the most effective employment of remedies is during the interval. A blister should be applied to the *sacrum*, and either be kept open or renewed. Vaginal injections of cold water, or a solution of the acetate of lead, will be found very useful. Tonics should be given; and of these some of the preparations of iron have appeared to me the most useful. The diet should be generous but not stimulating, and wine in moderate quantity may be allowed. An error in dress is generally committed by persons labouring under this affection. From the chilliness they feel, they are apt to clothe themselves too warmly, especially about the loins and hips, and this almost always increases the discharge. Spunging the loins and lower parts of the body with cold salt water has been employed with excellent effect; it removes the distressing weakness of the loins, and the general lassitude, and seconds most powerfully the more direct remedies.

The second form differs from the former in the more or less copious discharge of clots of blood, along with the proper secretion.

It rarely occurs in young or unmarried females, and I have scarcely seen it under the age of thirty. The subjects of it are generally delicate women of the leucophlegmatic temperament, whose constitution has been injured by disease or frequent child-bearing. The disorder appears gradual in its progress; one or two small clots appearing at first and almost unnoticed by the patient; then perhaps an intermission and a return in increased quantity. After it has persisted for some time, the loss of blood is often very considerable, even sufficient to cause fainting. The effects are similar to those observed from the continuance of the first form, but much more severe. The pulse is feeble, but not quickened; the strength greatly exhausted; the back aching, and so weak, that the upright position or walking is very distressing; the countenance is colourless, and the patient is very liable to local congestions, resulting from the unequal balance of the circulation. A vaginal examination throws no light upon the nature of the disease. The *os uteri* is found rather more open than natural; but its lips are not thickened, nor are the cervix and body enlarged; no increase of heat is observed.

The disorder is almost always complicated with uterine *leucorrhoea*.

The *causes* of this variety are nearly the same as those producing the former species, and therefore I need not dwell upon them, but the pathology is evidently different. It is impossible not to regard it as dependent chiefly on a congestion of the vessels of the *uterus*, although the degree is too slight to be detected by internal examination. It is probable, I think, that it may be the commencement of the third form. At present, however, I cannot speak positively about it.

The treatment does not differ materially from the last described. Opium, lead, or the ergot internally at the time of the attack, with counter-irritation, the *douche* to the back, cold sponging externally, with cold vaginal injections, constitute our main resources. Large doses of dilute sulphuric acid in infusion of roses, decoction of logwood, with vegetable or mineral tonics, are often very useful. The patient should be kept extremely quiet during an attaek, and if exercise be taken during the interval, it should be in a carriage. The diet should be moderate in quantity but nutritious, and wine may be allowed. The stomach and bowels will require to be regulated by suitable medicines.

All possible causes, and every thing likely to aggravate the complaint, must be excluded with the utmost rigour.

The *third form* differs considerably from the other two. The discharge is more profuse and its effects much more severe; it is accompanied by decided alterations in the condition and relations of the *uterus*, occurs at a later period, and is more difficult to cure. As I know of no accurate description of it in any book, I must draw upon the cases I have seen for my description, subject to the deficiencies consequent upon so limited a source of information. I have sufficiently accurate records of about twelve of these cases, and from them I shall endeavour to complete my sketch. The attack is not confined to any one kind of constitution or temperament; it occurs in the plethoric and in the debilitated, in the melancholic as well as in the sanguine. I have never seen it in a patient under forty years of age, nor after the cessation of the catamenia. The attack is preceded for some time by irregularity of the menses, both as to time, quantity, and the duration of each period, with occasional uterine leucorrhœa during the intervals. After the *menses* have continued naturally for about twenty-four hours, the shedding comes on. Large clots are expelled, and the fluid discharge is vastly increased in quantity. At first the attack lasted seven or ten days only, but after a while it occasionally continued through the whole interval, and terminated only after the next period, either gradually or suddenly. In one patient the discharge was so considerable as to excite fears for her life. The recumbent posture had no effect upon the discharge, as much flowed during the night as during the day, but any exertion or long standing never failed to increase it.

During the attack the patients complained of excessive exhaustion, of a sense of weight in the *pelvis*, of a dull pain occasionally, and of weakness of the loins. Almost all experienced difficulty of passing water, especially after standing long, and some were obliged to lie down before they were able to do so.

The general health of course suffered considerably, the appetite diminished, the tongue was clean but of a pale colour, the bowels became constipated, the surface blanched, and the strength reduced. The pulse was quiet, though enfeebled in proportion to the loss of blood.

On making an internal examination, the *os uteri* was found somewhat lower in the *pelvis*, and directed more towards the sacrum than naturally. It was more open than usual in a healthy subject, and the cervix more or less swollen, especially anteriorly, where it expands into the body. The body itself was enlarged and much more so anteriorly than posteriorly It appeared tilted forward by the increased weight, so as to press upon the bladder. No increase of heat was observed in the vagina or about the cervix. The cervix and body of the *uterus* were slightly tender on pressure. On withdrawing the finger it was covered with a sanguinolent discharge, somewhat more fluid than blood, and devoid of smell.

The amount of these changes of course varied in different cases,—in some the cervix appeared the part principally affected, whilst in others the body as far as the finger could reach felt greatly swollen. The discharge appeared to be in proportion to the degree of congestion. The slight anteversion of the *uterus* detected on examination *per vaginam* explains very satisfactorily one symptom of which all without exception have complained, viz. the dysuria after long standing resulting from the pressure of the swollen *uterus* upon the bladder.

The duration of the disorder varies very much. It may disappear spontaneously, or, from the remedies employed, after three or four months, or it may continue for two or three years. In these latter cases, however, I always found that there had been periods of freedom from the disease.

A recurrence of the disorder after an apparent cure is by no means uncommon, so that the patient requires to be watched during one or two succeeding monthly periods.

Pathology.—If we consider the time at which these attacks occur,—a period at which there is always an accumulation of blood in the *uterus* for the performance of its healthy function; if we notice also the slow progress and subacute character of the symptoms, with the peculiar terminations of this disorder, and collate these with the results of a vaginal examination; we may fairly conclude, that the disease is rather of a passive than active character; that it is in fact a congested state of the uterine vessels; and that the discharge is the result, not of secretion, but of the rupture of some of the vascular twigs which ramify on the lining membrane. I have not been able to detect any special cause unless we estimate the peculiar age at which it occurs as such.

There is one point of view in which this form of menorrhagia possesses great interest. When we recollect that the age at which alone it has been observed, is also about the period when many organic diseases of the *uterus* commence, we are tempted to ask whether it may not be the precursor of those more serious affections? It appears very probable that repeated congestions may leave the *uterus* predisposed to them, and if this connection be established, this class of disorder must be regarded of far more consequence than their intrinsic importance would lead us to suppose.

The *diagnosis* of this affection is not difficult. Our suspicions will first be excited by the admixture of blood with the menstrual discharge,—its persistence after the normal period for that secretion has expired, and the peculiarity in the evacuation of urine. All doubt will at once be removed by a vaginal examination.

It may be distinguished, 1. From inflammation of the *uterus*, by the absence of increased heat, the slight degree of pain and tenderness, the occasional recurrence and subsidence of the attack, and the natural, or almost natural, state of the tongue and pulse.

2. Non-enlargement of the organ from morbid deposition, by the hemorrhagic tendency without ulceration, and by the subsidence of the swelling.

3. The hemorrhage attendant on corroding ulcer or cancer comes on irregularly. It may be at the menstrual period or during the interval; but when it occurs before the cessation of the menses, it appears to be quite unconnected with that function; besides much more pain is experienced in these diseases than in the form of menorrhagia I have described, and the ulceration detected on examination decides the question.

4. A vaginal examination will prevent our confounding it with the hemorrhagies arising from cauliflower excrescence and polypus of the neck of the *os uteri*, but there may be some difficulty in a case of polypus of the *fundus*, which has not been expelled through the *os uteri*. The data for our guidance are principally the results of a careful internal examination; the concurrence of the shedding with the menstrual periods; the reduction in size of the *uterus* during the intervals of the attacks, and the effects of remedies.

Prognosis.—Of all the cases I have seen none have proved fatal; and though some have proved tedious, yet all were ultimately relieved. One of the first signs of improvement is the cessation of the uterine *leucorrhœa* during the interval; the subsidence of the *uterus*, and the diminution of the tenderness.

Treatment.—Although the complaint appears simple, the attempt to restrain the hemorrhage during the attack is often unsuccessful. I found acetate of lead in large doses and opium ineffectual. Cold to the *vulva* and *enemata* of cold water were equally powerless. Plugging the vagina arrested the discharge for the time, but the irritation it excited prevented the subsidence of the disease. Leeches to the *vulva* had no effect upon it, and preparations of iron did little or no good. The only remedy, in short, that appears to have the power of controlling the disease during the menstrual period is the ergot of rye. It may be given in doses of from five to ten grains, twice or thrice a-day: I think it is less liable to produce the ill effects which sometimes results from its exhibition in divided doses, than when a larger quantity is given at once.

Absolute rest is requisite. The patient should be placed on a hard bed, lightly covered with bed-clothes. After the shedding has been arrested a blister may be applied to the *sacrum*. Should the discharge persist during the interval, in spite of our exertions we shall often be more successful at the termination of the next monthly period, at which time I have already said that the disease often subsides spontaneously. But if we succeed in arresting the hemorrhage, our task is only half accomplished, as it is during the period of quiescence that we must so act upon the *uterus* as to prevent a recurrence.

Counter-irritation should be maintained; vaginal injections of cold water, or a solution of the acetate of lead, should be used twice a-day; rest should be strictly enjoined. Tonics, mineral or vegetable, may be given, and the bowels kept free. Cupping the loins is useful in the severer cases. The diet should be liberal and nutritious, and wine may be allowed. Very little exertion should be made, until the next period has passed safely over. The patient may then take moderate exercise. The vaginal injections ought to be continued for some time, and when they are omitted, the back and lower parts of the body should be sponged with cold water twice a-day. I need hardly add, that great care should be taken to remove all possible causes of the disease.

104, *Stephen's Green, Dublin.*

ART. V.—*On a Peculiar Animated Motion observed in the Globules of the Blood.* By RICHARD EMMERSON, Esq. Surgeon; and Mr READER.

THE indefatigable zeal with which many eminent scientific persons, both in this country and on the continent, are investigating the structure of organic and inorganic substances by the aid of the microscope, together with the very interesting communications which Dr Sharpey has made on the peculiar motion excited in fluids by the surfaces of animals,* induces me to allude to a no less singular movement observed in the globules of the blood, and which hitherto, I believe, has remained unnoticed. On the specific cause of this action various opinions may exist; and it must therefore remain for future observations to show the fallacy, or confirm the truth, of the conclusions which have been attached to the facts I have adduced.

No doubt, I believe, is now entertained that the organic particle or globule, both of the blood, and of the sap of plants, possesses, while it is a component part of the circulating fluid, a vital power or movement, inherent in itself, and independent of the influence of the vessels or tubes in which it moves. The truth of this opinion appears sufficiently established, by the rapid and peculiar movements observed in the globules of various animals; by such motion being destroyed by electricity, acids, alkalis, or by whatever destroys their vitality; and more especially, by attentively observing the slow and circular route of the globules in the *Chara hispida*, in which, as in other plants, the vessels possess but little or no propulsive power, and the circulation consequently carried on, either by the formation of a partial vacuum, or by a vital action inherent in the globule itself. Subsequent investigations into the minute structure of plants may probably prove an organization, like the *cilia* described by Dr Sharpey, peculiarly fitted for the purpose, and which may more satisfactorily explain this phenomenon.

The movement, however, to which I am desirous of directing the attention of microscopical observers, does not take place until blood has been drawn from a vein five or six days. It was first observed by my friend Mr Reader, who possesses highly perfect and powerful magnifying lenses, and is no less equally practised in the knowledge of their use and power. When I first witnessed the extraordinary animated motion of the globules, I readily imputed it to the effects of incipient decomposition in the fluid, or to some change in the organic structure of the globules themselves. But from further observations and inquiries into the probable cause of this action in the particles of the blood, I am convinced that this motion must be the effect of something more than merely a mechanical or chemical impulse. I have herein transcribed Mr Reader's memoranda on this singular phenomenon.

" It was on the 6th of September 1834, that, after a series of observations on the blood, I first observed the globules to have a peculiar motion one among another under the microscope. Doubting the accuracy of my vision, I submitted the blood, which had been drawn from a vein five days before, to repeated examinations under different lenses, without in any degree impugning the previous observation. The serum in which the globules floated was then slightly diluted with distilled water, when I witnessed the most unequivocal living action among the globules, moving about in all directions, sometimes actually appearing to coalesce, if such an expression may be admitted, and then separating; passing over, and on one side of each other, and continually altering their shape, position, and appearance; and as they rolled over, there occasionally seemed to be organs obscurely perceptible under the highest magnifier. These bodies possessed a slightly tinged reddish yellow centre or nucleus, with an envelope or circumference of a pale whey-like colour. I became so strongly impressed with the extraordinary nature of this new fact in the physiology of the blood, that I continued these observations for four or five months, during which time the facts were witnessed and confirmed by my intelligent and scientific friends. I perfectly assured myself and them, by very numerous, long-continued, and often-repeated experiments and observations, that the motions alluded to were entirely (to use the words of Raspail) independent of any inclination of the object-holder, agitation of the air, shaking of the floor of the apartment, the hands, the breath, the pulsation or the respiration of the observer; or, in short, by any other delusion, either mechanical, chemical, or optical. Hence I concluded that I had fully established, by the most careful observations, the truth of the following phenomena.

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* Edinburgh Medical and Surgical Journal, Vol. xxxiv. p. 113.

1*st*, That the globules or spherical particles of the blood possess an inherent vital action, with the faculty of voluntary motion among themselves. 2*d*, That, although this peculiar action or voluntary motion is not visible until the interval of a few days after they have been drawn from the body, yet it is not the result of a chemical or fermentative process in the fluid in which they float, but that it is an action *sui generis*, appertaining to themselves alone, since each globule retains its essential characteristic, and in no instance loses its individual identity. Neither can it be the effect of a new order of existences arising from the decomposition of the blood, since in every instance in which decomposition or fermentation had taken place, the globules themselves exhibited not the least voluntary or peculiar motion. 3*d*, That acids, salts, and alcohol, if added to the blood, when it was first drawn, entirely prevented and suspended the occurrence of this living action;—the salts muriate of soda and nitrate of potass, generally reducing the diameter of the globules, either by the solution of their outer coat, or by condensation of their substance, and the diluted acids generally disintegrating their bodies. Sulphur seemed to induce a mass of animalcular motion in the serum of the blood, in addition to the action peculiar to the globules themselves.

The lenses principally used in these observations were, 1*st*, a single plano-convex lens on Wollaston's plan; 2*d*, a doublet plano-convex lens do.; 3*d*, a similar lens; 4*th*, a compound power with one of Cary's magnifiers of 100;—magnifying the diameters from 200 to 700 times.

The latter power, No 4, exhibited their motions most distinctly, from the field of view being much enlarged. Various other powers and instruments were also employed in the course of these observations; but the principal reliance was placed on the four above-named.

The annexed sketch (Plate V. Fig. 1,) represents some of the most striking appearances which the globules assumed in the course of these observations, as they moved on the glass object table of the microscope.

I shall for the present abstain from making any practical application of the facts stated; but, in the prosecution of these inquiries, endeavour to ascertain on what change or peculiar state of the blood they depend.

Sandwich, *22d October* 1835.

Art. VI.—*Cases of Acute Pulmonary Diseases and Gunshot Wounds of the Thorax.* By John Adamson, Surgeon, Royal Navy. In a Letter to the Editor.

Sir,

On the memorable occasion of the naval attack of Algiers under the direction of the late Admiral Lord Viscount Exmouth, there came under my observation some cases of gunshot wounds of the thorax, which I am inclined to think may prove sufficiently interesting to obtain insertion in your distinguished Journal. That the method of treatment pursued, and which was attended with success, may appear neither singular nor accidental to those who consider the effects of these injuries, but derived from much analogous practice in disorders of the chest,—I beg to premise an extract of an official report sent to the Commissioners for sick and wounded seamen, enumerating the disorders that occurred on board of a different ship, two or three years antecedent to the time of the accidents alluded to; also some cases of violent disease, extracted from the official journal of the same ship, illustrative of the nature of the diseases and practice pursued on that occasion. I am inclined to hope that the tabular forms, as well as the detail of the cases, may furnish some gratification, particularly to those engaged in the same hazardous duties, as exhibiting a specimen of medical statistics of cruizing ships in time of war, and in recording a method of cure derived from observation and experience, during a long residence in ships of the line employed in every variety of climate. I beg, Sir, you will pleased to observe, that these occurrences were at a period when the distinctive application of auscultation and percussion had not lent their aid in discriminating the physical signs of a class of diseases so peculiarly their province to elucidate, I am, &c.—John Adamson.

Exscript of an official report of the sick and wounded of H. M. ship the Cressy of 74 guns, between the 1st of December 1813, and the 22d of February 1814, employed in the North Sea.

Diseases, &c.	*At present on the sick-list.*	*Discharged to duty.*	*Sent to hospital.*	*Total.*
Inflammatory remittent fevers, and acute pulmonary diseases,	10	27	0	37
Measles,	1	3	5	9
Erysipelatous fevers,	2	1	0	3
Rheumatism (acute,)	0	4	0	4
Enteritis,	0	3	0	3
Diarrhœa,	0	3	0	3
Syphilitic complaints,	2	51	0	53
Jaundice,	0	1	0	1
Epilepsy,	0	1	0	1
Wounds and accidents,	0	11	0	11
Ulcers and abscesses,	4	5	0	9
Total,	19	110	5	134

Mr D. Gellatlie, Assistant Surgeon. Mr George Black, do.

The Cressy having been employed in the West Indies, during the spring and summer months, on returning to England at the end of August, it became necessary to put her into dock at Portsmouth. She remained in this state under repair, during several weeks of the rainy season of the year. This operation, together with the new ballast received on board when refitted, rendered her nearly as damp and unwholesome as if she had been a new ship. During the interval she was in dock, the greater part of the crew, amounting to 600 men, were employed in transporting two men of war from the ordinary at Portsmouth to the river Thames to be repaired. Being removed by these extra duties from under the salutary routine of discipline, necessary for the preservation of their health, they acquired a predisposition to disease when they returned to their proper ship. By the time the Cressy had arrived at her anchorage off the coast of Holland, being the month of December, the winter had set in with great severity, there being intense cold and sharp (or easterly) east winds. The pulmonary diseases have been extremely acute, apparently epidemic, and attended with a remittent fever, observing a period of seven days and upwards. This epidemic form of pulmonary disease, which appears to require a certain course and duration for its resolution, is, according to my observation, by far more violent and intractable than when simply sporadic, and consequent to incidental exposure to cold, over-exertion, intemperance, and such other occasional causes. In one of those diseases, where the inflammation appeared to extend to the regions of the liver and stomach, I found it necessary, for the preservation of life, to take away during the first five days of the disease not less than 175 fluid ounces of blood. Six ounces more were extracted on the seventh day, which exhibited the strongest indications of inflammation; the mass forming slowly into a coagulum, of which the upper half consisted of a white-coloured albumen, having the surface covered with a pellicle, which being separated, assumed the appearance of a firm organized membrane. Another lost 143 ounces; some others 130; and in general it was required, in order to subdue the local affection and effect a resolution, to practise blood-letting to the amount of seventy-six or a hundred fluid ounces and upwards. Those at present on the sick list are in a state of convalescence.

Besides the above tabular view of the sick belonging to the Cressy's ship's company, between thirty and forty supernumerary marines came under my charge at the same time. Five hundred and fifty soldiers of that corps were conveyed from England by the ship and landed on the coast of Holland, to co-operate with the army employed there. The winds being adverse and blowing hard, many of these men, badly provided with the means necessary to defend them from the inclemency of the weather, were obliged, during a tedious passage of two or three weeks, to sleep on the ship's decks, which were not unfrequently covered with water, in consequence of the motion of the vessel. Some of them remained ill on board, others were sent back from their cantonments for cure; two died,—one an emaciated young man, who had never before served out of England. He was affected with pneumonia, which had assumed a chronic character when he came under my observation. Such evacuations were put in practice as served to abate the local affection; but the symptoms of fever, and the frequency of the pulse, never having subsided, he sunk under the disease. The other was a fatal case of dysentery,—the sequel of measles in a man sent on board from the Island of Beveland, who had but a short time before returned from India. The immediate cause of death seemed to proceed from very general erythema of the alimentary canal; he being harassed with a flux from the bowels, which neither venesection, aperients, alteratives or absorbents were in my hands adequate to remove.

H. M. Ship Cressy, JOHN ADAMSON, *Surgeon.*
At Deal, 22d Feb. 1814.

Cases extracted from the Medical Journal of the above ship, detailing the symptoms and means of cure employed on the occasion of the foregoing report.

I. *Cases of Pneumonic Inflammation.*

Case 1st. *Coast of Holland, 27th December* 1813.—John Brown, aged 33, a robust man, of the sanguineo-choleric temperament, of a fair and florid complexion, with reddish brown hair, complains of oppressive pain about the eighth, ninth, and tenth ribs of the right side, attended with impeded respiration, and hard painful cough. The tongue is foul; the skin hot; and the pulse hard and frequent.

Fiat v. s. ad ℥xxxij. Sumat Calomelanos, gr. v.—℞. *Pulv. Jalap., Rhei, Potas. supertart. a ʒss. M. fiat pulvis ex aq. menth. sumendus.*

P. M. Pain somewhat alleviated, but the fever remains most violent.

Extrahantur sanguinis ℥xxiv. *Lateri dolenti imponatur empl. Lyttæ.*

28th December. Has passed a bad night; complains of severe pain, highly aggravated when he coughs; bowels soluble; fever not relieved.

Fiat missio sanguinis ad ℥xx.—℞ *Vin. Antim. Tart.* ʒss. *Mist. Camph.* ʒij. *aq.* ℥j. *M. fiat haust. quinta qq. hora s. Infus. Sem. Lini,* and other diluents at pleasure. P. M. *Repetatur v. s. ad* ℥xvj.

29th December. Blood drawn bears the strongest marks of inflammation; pulse very frequent and irritable; respiration impeded; pain of the side considerably relieved, and has shifted to the sternal region. The cough, which is very painful, brings up viscid phlegm. Countenance bloated and pale; eruption on the lips; appetite gone; sleep totally suspended during these last forty-eight hours. Four loose dejections.

Iteretur, v. s. ad ℥xij. *Diluents.*

30th December. *Fiat v. s. ad* ℥xxiv. *Sumat calomelanos* gr. v. *et Sol. Magnes. Sulph.* ℥iv. *tribus horis postea.*

31st. Has passed an extremely bad night, from severe cough, impeded respiration, and pain of the side, low down and extending to the epigastric region. The pulmonary complaint appears to be complicated with inflammation both of the liver and stomach. The bowels are open; the pulse frequent, thrilling and irritable; and the countenance pale, bloated, and dejected.

Extrahantur sanguinis ℥xvi. ℞ *Solut. Magnes. Sulph.* ℥iv. *Tinct. Opii,* gut. xv. *M. s. quam primum.*

P. M. Has had several alvine dejections, with perceptible relief.

Iterum fiat v. s. ad ℥xvj. *Applicetur super sterno Empl. Lyttæ. Contin. Infus Sem. Lini. pauxilla Gum. Acaciæ addita.*

1st January 1814. Bleeding to the quantity of fourteen ounces was repeated during the night, being urgently required on account of a sense of suffocation, and pain at the lower end of the sternum, stretching upwards and downwards from that part, the inflammatory pulse, and the blood drawn before, exhibiting a firm buff-coloured incrustation. He is better in every respect this morning; but the pulse remains hard and frequent, notwithstanding he has lost during these five days past 174 fluid ounces of blood.

Cont. Infus. Sem. Lini, et diluentia.

2d Jan. Has passed a better night, and is more free from pain. He can bear some degree of pressure on the epigastrium, which hitherto caused extreme pain. I am unable to decide if this pain proceeds from pressure against the diaphragm in an inflamed state, or whether the stomach itself, or the convex surface of the liver, may be similarly affected.

Sumat Emuls. Gum Acaciæ et Diluentia.

3d Jan. Oppressed breathing and painful cough remaining; six ounces more of blood were extracted this morning. The blood when cold still exhibits the strongest marks of inflammation.

Cont. Demulcent. Sumat mist. salin. effervesc. ℥iss. *3tia qq. hora.*

4th. *Medicamenta ut heri.*

5th. Says he is much relieved, all pain being removed, except when he coughs or is desired to make a deep inspiration. He expectorates nearly a pint of clear mucus, of a bluish tinge, during the twenty-four hours. The pulse remains hard, but is much less frequent. He is able to get out of bed for necessary occasions.

Contin. Mist. Salin. Effervesc. utrique dosi additis Tinct. Scillæ gut. xxx. *necnon sumat Liquoris Antimon. Tartar.* gut. xl. *terdie.*

6th. Is much better this morning. He took eighteen drops of laudanum last night, and has had refreshing sleep.

Sumat Ol. Ricini. ʒvj. *ex Menth. pip. Repet. Tinct. Opii., h. s. Emulsio Arab. v. a.*

8th. To continue the demulcents and anodyne draughts.

9th. Idem.

10th. To take half a pint of wine diluted, and in divided quantities during the course of the day. To continue the demulcents and opiate.

13th. Has got out of bed, and sits up during a considerable part of the day. The pain of the thorax and epigastrium, as well as the dyspnœa, are wholly removed. There is still some cough and mucous expectoration, but both are daily becoming less. The functions have become regular; the tongue is clean; the pulse natural in the recumbent posture, but frequent and irritable when out of bed; appetite keen; he takes half a pint of wine daily, and a limited quantity of animal food.

Sumat Lactis Ammon. ℥ss. *ter die. Haust. anod. h. s.*

18th. Strength and general health improved; has occasional paroxysms of coughing, but unattended either with pain or dyspnœa; pulse more firm when he gets out of bed. Yesterday; he took a dose of castor oil, which is to be repeated, and the anodyne at night. He wears a stimulating plaster constantly applied to the breast.

25th. The pectoral complaint is removed; appetite good; he continues weak, and complains of pains in the legs, apparently rheumatic.

℞. *Decoct. Cinch.* ℥iss. *Mist. Acid. Sulph.* ℥iss. *M. ter die. s.*

From this time till the 22d February, when on the arrival of the ship in England he was sent to the Royal Naval Hospital at Deal, he continued to improve in health. The report in my Journal on the 21st February states, "He regains strength, and his ruddy complexion returns. There does not appear to be any remaining disease of the chest, as he can make the fullest inspiration without either pain or difficulty; there is still slight cough, and he sweats considerably during the night, once or twice a week; the appetite and functions are regular."

The Cressy having been paid off, I was appointed to be surgeon of the Cumberland of 74 guns, which sailed from Portsmouth in June, with a convoy for India. When the convoy had got as far as the equator, three seamen were sent on board from one of the Indiamen, on account of some insubordination, one of whom was the above John Brown. He enjoyed robust health, and although the Cumberland passed through every variety of climate, during the succeeding twelve months, he never complained of sickness, but was indeed one of the most active and healthy men on board.

From the above case, and many others of the same kind, I am enabled to form a decided opinion, that the loss of even great quantities of blood, when necessarily abstracted for the removal of acute disease, leaves no permanent injury to the constitution, provided organic disease is thereby obviated; whereas, in the case of half cures, or where the local disease is not wholly removed, not only the health, but the existence of the unfortunate sufferer becomes deeply involved.

Case 2d. W. Powel, seaman, aged 33. Coast of Holland, 1st February 1814.—Of robust form and dark complexion, says he was seized with rigors during the night. There is febrile heat; great oppression; cough and expectoration of a thin blood-coloured fluid; deep-seated and oppressive pain of the right side, stretching to the back-bone; pulse frequent, feeble and compressed; bowels not irregular.

Extrahantur Sanguinis ℥xxxii, pleno rivo.—℞ Jalap. Rad. pulv. Potas. supertart. ā ʒss. Solut. Ant. Tart. Aq. Menth. pip. ā ℥i. M. quam primum s. Tepid drinks.

2d February. After the bleeding yesterday, which did not show the inflammatory coat, he was seized with faintness and debility in an alarming way, the pulse continuing very feeble until the evening; but the symptoms of deep-seated and extensive pneumonia, accompanied with sanguine expectoration, show that the appearance of debility is deceptive.

Fiat missio Sanguinis ad. ℥xx. Sumat. Vin. Ant. Tart. ʒss. et Mist. Salin. effervesc. ℥ij. 3tia qq. hora. Demulcent and tepid drinks.

P. M. Pain and sense of suffocation more urgent.

Iteretur v. s. ad. ℥xxxii. Impon. lat. dext. Empl. Cantharid.

3d February. The blood drawn shows marks of intense inflammation. The symptoms are somewhat moderated; the pulse is intermittent and obstructed; pain on the right side impedes the respiration; the bowels are confined.

Iteretur missio Sanguinis. Sumat P. Rad. Rhei, ʒss. ex. aq. Menth. Linseed tea and warm diluents to be given assiduously.

4th Feb. Symptoms still violent; he complains of a sense of great weight in the region of the right lung; there is severe cough, which brings up a gelatinous yellow sputum. He complains of pain, accompanied with arterial pulsation, in the epigastrium, that cannot admit being pressed by the hand; there are occasional accessions of paleness, giddiness, and threatening sensation in the head. The pulse is intermittent and irregular. Several alvine dejections have taken place. He was bled to six ounces only yesterday, which he bore very ill, on account of weakness.

Though I believe this appearance of debility to be unreal, and occasioned by the obstructed passage of the blood through the diseased lung, I dare not go farther in the use of the lancet for the present. The blister is open.—To take some weak beef-tea, sago, &c.

℞. *Mucilag. Gum. Acaciæ,* ℥iiss. *Syr.* ℥iss. *Aq.* ℥iv. *Tinct. Scillæ—Liquor. Ant. Tart.* ā ʒi. *M. Sumat* ℥i. *2da qq. hora.*

Linseed tea and diluent drinks given warm in small quantities, and frequently repeated.

P. M. The symptoms of oppression becoming more urgent, and the pulse having risen, sixteen ounces of blood were extracted, which exhibited a buffy coat an inch in thickness.

5th Feb. Extreme uneasiness and dejection of spirits; eyes glased, and acrid secretion around the eyelids. The pulse intermits every third beat, and is extremely irregular, threatening syncope. To be blooded after dinner-time. Continue expectorating mixture and plentiful dilution.

6th Feb. Was bled in the afternoon of yesterday to twenty ounces. A white pellicle, similar to a membrane, formed on the surface of the blood. The pulse is more regular, and the symptoms are less distressing. To continue the expectorating mixture and demulcents.

7th Feb. Bloody expectoration, and great cough continuing. The bleeding was repeated yesterday in the afternoon to seventeen ounces; pulse still intermittent and irregular; was delirious during the night. He took a small dose of laudanum in the evening; blood drawn is remarkably long in forming a coagulum. To take beef-tea and demulcents.

8th Feb. The respiration is relieved; but he breathes in a quick and hurried way, chiefly by the abdominal muscles; the pulse has expanded, and become equal, frequent and hard. The teeth are covered with black sordes, and tongue with a white encrustation; he expectorates mucus tinged with blood; there is a glazed film over the cornea, and morbid secretion around the edges of the eyelids. Bowels adstricted.

℞ *Pulv. Jalap. Potas. Supert.* ā ʒss. *M. ex Aq. Menth. s. Mucilaginous and diluents.*

9th Feb. Medicine procured one dejection; he remains in a very dangerous state; pulse febrile and frequent, but more free, as well as the respiration.

Cont. Mist. Mucil. et Demulc. Sumat Tinct. Opii, gut. vi. *ter die.*

10th Feb. *Ut heri. Sum. Ol Ricini* ℥ss. *ex. aq. Menth pip.*

11th Feb. Two motions of the bowels; the pulse becomes regular; the expectoration is free from blood.

Cont. Mist. Mucilag. Lactis Ammon. ʒii. *ex Aq. Menthæ pip. ter die.* Light nourishing broths, sago, &c.

12th Feb. Pulse hard and oppressed, but the pectoral complaint appears to be greatly removed.—*Cont. Med.*

13th Feb. *Cont. Med.*

14th Feb. Fever has totally subsided as well as the inflammation. He is very feeble and has lost his voice; appetite improves; bowels regular. *Cont. Lac. Ammon.* and regimen as formerly.

He continued to take expectorants and pectoral medicines till the end of the month; afterwards tonics and bitters till 27th March, when he returned to his duty in perfect health.

The above may be considered as extreme cases, and the quantity of blood abstracted beyond what is usually required for the solution of pulmonary disease. In one person that came under my care some considerable time afterwards, I was obliged to bleed to a still greater extent, and with perfect success. In no instance on board ship have I had occasion to observe those constitutional cachexies which have been represented to result from large detractions of blood. Indeed there seemed to be a renovation of health and improvement of the complexion and habit after the successful treatment of such complaints. But nothing can be more disastrous than those diseases, when, in consequence of neglected, mistaken, or inefficient treatment, they are suffered to run on to the passive or secondary stage. Besides the derangement of function in the organ more immediately affected, the constitutional irritation seldom subsides, assumes those cachectic appearances, and in general brings the unhappy patient through a lingering and hopeless existence to a premature grave.

I am doubtful if the same treatment by large depletion applies with equal propriety to the more abstemious and temperate landman, as to the well-fed and high-spirited sailor, whose constitution has become indurated by toil and exposure to the weather, and who, besides a large daily allowance of spirituous liquors or wine, is too apt to indulge in those potations in an excessive degree when opportunity offers. Since my retirement from His Majesty's service, I have had occasion to observe a person of the former description fall unexpectedly into a very dangerous state of convulsions after large bleedings, which had been previously required to remove an acute pulmonic disease.

Dilatation of the right ventricle of the heart, which simulates *pneumonia*, in being accompanied with hard and full pulse, *dyspnœa*, and cough, will not safely admit of abstraction of blood to any great extent. I have observed that even moderate depletion with the lancet, in aged people, with asthma from diseased heart, has induced an alarming state of *syncope;* although no remedy is more required, or affords more effectual relief, whenever such chronic diseases have become excited into a more acute form by occasional changes of temperature or improper indulgence. I trust I shall be pardoned for obtruding these remarks, as I should feel extreme regret to recommend such extensive evacuations without due precaution, and an evident necessity for their employment.

Return of the Sick and Wounded of H. M. ship the Superb of 80 guns, between the 28th of July and the 11th of October 1816, employed in an expedition sent from England against Algiers, by John Adamson, Surgeon of the ship.

Diseases, &c.	*No. on sick list.*	*No. cured.*	*No. sent to hospital.*	*Dead.*	*Total.*
Inflammatory remittent fevers, and acute pulmonary diseases,	0	24	7	0	31
Chronic do. - -	0	0	1	0	1
Rheumatism, - -	0	3	1	0	4
Venereal disease, -	3	29	0	0	32
Ulcers and abscesses, -	0	11	1	0	12
Cholera, - - - -	0	4	0	0	4
Ophthalmia, - -	0	1	0	0	1
Erysipelas, - - -	0	2	0	0	2
Scarlatina, - -	0	0	1	0	1
Jaundice, - - -	1	0	0	0	1
Anasarca, - -	0	1	0	0	1
Epilepsy, - - -	0	2	0	0	2
Retention of urine, - -	0	1	0	0	1
Dropsy of the knee-joint, -	0	1	0	0	1
Cutaneous disorders, - -	0	5	0	0	5
Wounds and accidents, -	2	58	11	2	73
Killed in battle, - -	0	0	0	8	8
Killed by falling from the main top,	0	0	0	1	1
Total, -	6	141	23	11	181

Mr P. H. M'Lean, Assistant-Surgeon.
Mr Peter Fairbairn, Do. do.

II. *Cases of Gunshot Wounds.*

1. A young seaman, named William Bowns, was wounded by a grape-shot, which penetrated the thorax through the eighth rib of the left side. There was profuse bleeding, which continued to be poured out through the external wound till the time of his death, about forty hours after the accident.

2. John Worth, an active landman, of sanguine complexion, 22 years of age, was wounded by a rough piece of metal, which perforated the seventh rib on the right side, and lodged in the thorax. There was great loss of blood, which continued to flow through the external wound for the space of two days. During nine days that he survived the infliction of the violence, he suffered extremely from ardent fever, want of sleep, great anguish and restlessness; being unable to obtain relief in any posture, or remain at rest for any considerable length of time. He complained more particularly of violent pain and tension about the hepatic region, and ultimately the skin became tinged of a bright yellow colour.

Notwithstanding the loss of blood from the wound sixteen ounces were afterwards taken from the arm, which afforded temporary relief. Purgatives were administered, which brought away black feculent matters mixed with blood. On account of the high temperature of the weather, the skin was sponged occasionally with water, and every soothing means employed that I could devise for mitigating his sufferings.

On inspecting the body after death, the right cavity of the thorax was found to be completely filled with serum deeply tinged with blood. The lung of that side had entirely disappeared, no portion of it remaining, excepting some shreds and filaments at the site of the root of the lung, apparently the remains of the blood-vessels and subdivisions of the *trachea*. An angular fragment of iron of the size and form represented in Plate V. Fig. 2, was found lying quite free and detached on the posterior part of the thorax. The *pleura costalis*, *mediastinum*, and *diaphragm* were highly inflamed and vascular. The inflammation had extended, notwithstanding the barrier of the *mediastinum*, into the left cavity of the chest. The *pericardium* was distended with similar blood-coloured serum. The surface of the heart was also deeply inflamed, there being depositions of coagulable lymph in the form of flakes adherent to it and the *pericardium*, and floating loose in the fluid. Want of time did not admit of the state of the liver and abdominal viscera being inspected.

3. 5th Sept. 1816. George Lee, aged 30 years, a private soldier of the Royal Marines, of full habit and athletic appearance, received a wound by a musket bullet or some missile of that form, which penetrated the cavity of the chest, through the fourth rib, about two inches on the left side of the *sternum*. I introduced my finger into the thorax through the perforated rib, which was smooth to the touch, and felt the breach in the lung, but could not trace the progress of the ball. He complained of numbness in the right axilla, which he said was occasioned by a violent stroke on the right arm inflicted at the same instant he received the wound in the breast, by some instrument which he could not describe. On examining the axilla, there was a sensation to the touch of a hard twisted chord, lying deep under the integuments running in a parallel direction with the great blood-vessels. He lies constantly on his back, and has been greatly fatigued by want of sleep ever since he received the wound. There is considerable swelling and tension of the right side of the chest, difficulty of breathing and fever. He is occasionally attacked with severe fits of coughing, which come on at long intervals, when the fever and *dyspnœa* become aggravated, and the pulse rises very much in tension and frequency.

The symptoms have been kept under by blood-letting and strict antiphlogistic treatment. Besides a considerable loss of blood by the external wound at the time of the accident, he has lost sixty ounces by the lancet at four different bleedings. The bowels have been freely purged. The use of vinous liquors, stimulants, and animal food was entirely prohibited.

6th Sept. Pulse more full and frequent; complains of headach. Bled to ten ounces.

7th Sept. In the afternoon, there being increase of fever, a sense of tightness and oppression on the right side of the breast, with *dyspnœa* and cough, he was bled to sixteen fluid ounces.

9th Sept. He was bled yesterday to the amount of fourteen ounces, on account of febrile excitement, *dyspnœa*, and pain in the epigastric region extending to the right side.

10th Sept. The bleeding was repeated last night to fourteen ounces. The blood when cold exhibits the highest indication of inflammation, being greatly buffed and cupped.

11th Sept. Yesterday, on account of painful tension of the breast, with difficult breathing and cough, he was bled to fourteen ounces, the breast was fomented, the bowels opened, and strict abstinence enjoined.

12th. Sept. Last evening the blood-letting was repeated to seven ounces, on account of aggravated cough and expectoration of coagulated blood. The tension of the lower part of the breast extending to the epigastrium having become oppressive, he took six drachms of castor oil in peppermint water, which operated several times. These remedies always afford decided relief for a time.

13th Sept. Yesterday he pointed out, situate under the belly of the *biceps* muscle, nearly half way down the right arm, a swelling, which gave him considerable uneasiness, although it had hitherto remained unobserved. By reason of the great bulk of the *biceps* in this person, I felt unable to determine whether it was a foreign substance, or some glandular swelling lying close to the bone. There being much reason to apprehend that a considerable quantity of fluid is effused in the thorax, which may require appropriate treatment, and notwithstanding the loss of 135 ounces of blood by the lancet, inflammatory symptoms continue to recur in diurnal paroxysms, I felt anxious, with the view of drawing a more accurate diagnosis, to make myself acquainted with the nature of the tumour. An incision was made upon it in an oblique direction, close by the outer edge of the muscle, through which a leaden bullet flattened on one side, as represented in Plate V. Fig. 3, was extracted.

Being now assured that no foreign substance remains in the thorax, and the circuitous traject of the ball being rendered plain, the prospect of a favourable result has become improved. As above stated, the missile entered the cavity of the thorax through the fourth rib, two inches on the left side of the *sternum;* it must necessarily have perforated the mediastinum, traversed the right lung, continued its course under the integuments of the axilla, and impinged against the right *os humeri*. It may be supposed that the bullet received its flattened impression in consequence of this collision; but its impulse being broken, instead of passing through the bone, it took a direction along its shaft, and settled nearly half way down the arm, where it remained unobserved till the sixteenth day of the accident, when it was removed by incision.

14th Sept. Yesterday, having indulged in eating some animal food in violation of the strictest injunctions to keep himself low, there was a great increase of fever, oppressed breathing and anxiety. He was bled to twelve ounces, and the bowels were repeatedly purged by castor oil and sulphate of magnesia given in different doses. To-day the oppressive symptoms are relieved, but he is by no means so well as he was some days back.

16th Sept. Bleeding repeated to eight ounces. To take an ounce of sulphate of magnesia in peppermint water.

18th Sept. The pulse becomes more soft and regular. He still complains of occasional pressure in the chest accompanied with cough. The blood-letting was practised two days back, on account of some expectoration of blood, of which there has been some recurrence since.

20th Sept. The pulse has become nearly natural in frequency, but there is still a hardness in its diastole. He still observes a spare regimen.

23d Sept. Complains of fulness at the pit of the stomach. He takes occasional doses of Epsom salts, which agree better than other purgative medicines, and afford relief.

29th Sept. Two days back, it became necessary to apply a blister to the right side, on account of accession of pain, which is now removed. The cough and expectoration have ceased altogether, and the oppressive sensations in the thorax are nearly removed. He walks about and takes some animal food. He takes Epsom salts every third or fourth day.

10th Sept. On the arrival of the ship at Plymouth, he was sent to the Royal Naval Hospital free from complaint, excepting some difficulty of lying on the right side. He was discharged from the hospital fourteen days afterwards, much recovered from the weakness brought on by his wound, and the evacuant plan pursued for his recovery, having lost 155 fluid ounces of blood by the lancet, besides a considerable effusion when he received the wound.

This person was wounded on board a gun-ketch manned at Gibraltar, and towed down to Algiers by the Superb. On the enemy's walls was a noted piece of ordnance of prodigious size, placed in an angle of immunity from the guns of the large ships. It was silenced by repeated discharges of the 64 pounder of the ketch, in which gallant attempt a great number of her small crew were killed and wounded by musketry, on account of her near approach to the batteries.

He possessed a remarkable degree of fortitude and firmness of mind, never murmured or complained, but submitted most readily to the repeated bleedings and measures employed for his cure; and this, as well as his robust constitution, I believe, was of no small advantage in effecting his recovery.

When he became convalescent, he took much pleasure in descanting on the boldness of his young commander Lieutenant Johnson.

A few months afterwards I received a letter thanking me for my attention to him when on board, in which he also informed me that he had perfectly regained his health, and been granted a small pension by the government.

This man was wounded on the 27th of August at Algiers; but not having taken notes of his case till the 5th of September, on account of the number of wounded that came so suddenly under my care, I cannot pourtray the early symptoms, which were more oppressive and threatening than when I began to keep a diary of his case.

Kincardine, February 1836.

ART. VII.—*Appendix to Abstract of Cases in which a portion of the Cylinder of the Intestinal Canal, comprising all its Coats, has been discharged by Stool, without the Continuity of the canal having been destroyed.* By WILLIAM THOMSON, M. D. Fellow of the Royal Colleges of Physicians and Surgeons.

IN a communication published in the 125th Number of this Journal, I gave an abstract of thirty-five cases in which a portion of the cylinder of the intestinal canal had become detached and been discharged by stool; and subjoined such general conclusions as an analysis of these cases at the time suggested to me. I am induced to revert to the subject for the purpose of directing the attention of the profession, in a more particular manner, to the occurrence of this accident in two classes of cases,—viz. cases of Hernia and cases of Dysentery; and I shall avail myself of the opportunity to consider more fully the natural processes by which the detachment and discharge of a portion of bowel may be effected. At the same time I have thought it desirable to bring together all the analogous cases which have come to my knowledge since the publication of the paper alluded to; and to communicate some additional information since obtained, relative to some of the cases there noticed; those, namely, numbered 11, 14, and 33.

The only information I possessed at that time relative to case 11, was derived from the description given by Dr Baillie[*] of some preparations in Dr Hunter's collection. On examining the catalogue of the anatomical portion of Dr Hunter's Museum, (now, as is well known, deposited in Glasgow,) the only preparations that could be supposed to answer to Dr Baillie's description seemed to be those marked R. 43, 44, 45, which are entered as follows. "Portions of diseased colon from a publican in Piccadilly. 44 and 45 came away in a dysentery he had, and recovered; 43 is the colon two years afterwards when he died. 44 and 45 seem to be portions of the internal coat ulcerated off. 43, however, does not explain this exfoliation, but appears ragged and ulcerated, with stricture at one place." If I be right in supposing these to be the preparations referred to by Dr Baillie, then case 11 obviously belongs to the series of cases in which an opportunity had occurred of examining the state of the parts after death; and ought to be added to those in which the disease originated in dysentery, to those in which the necrosed bowel came away in separate portions, and to those in which the process of recovery was attended with a certain degree of stricture.

Of case 14, originally recorded by Dr Legoupil, I was able in my former paper to give only a very imperfect account. I have since met with the following more circumstantial narrative.[†]

L. B. 4 years of age, of feeble constitution, but lively and healthy, was seized with small-pox on the 23d July 1820, and took no medicine till the 4th of August, when Dr Legoupil was summoned, in consequence of the child having, for some days, complained much of violent colicky pains in the belly, accompanied by much discharge of blood *per anum*, but no vomiting or hiccup. The abdomen was slightly distended, the right iliac region being more tender and depressed than the rest. The breathing was natural, the pulse strong and quickened. The pustules were beginning to dry off, and there was a disagreeable putrid smell about the child's bed. The same day there appeared at the anus a purplish red tumour of the size of a pullet's egg, from the surface of which some drops of blood issued. It was supposed to be a prolapsus of the mucous membrane of the rectum, and fomentations were applied. On the 5th, the tumour exhaled a putrid odour, the stools passing in a liquid state. On the 6th, 7th, and 8th, the same state continued; but on the 9th, the swelling burst forth, drawing after it a cylindrical body resembling a piece of small intestine, and about six inches in length. This substance was carefully examined by Drs Legoupil and Delisle, and afterwards sent to the Societé de Mèdecine de Paris, where it was recognized to be the entire of the cœcum, and about six inches of the ileum. The child recovered and did well.

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[*] In his account of a singular disease in the great intestines, published in the 2d Volume of the Medical and Chirurgical Transactions.

[†] Johnson's Medico-Chirurg. Review for March 1824, iv. 932.

With regard to the 33d case, I was unable in my former communication to give any farther information than was to be found in the catalogue of preparations contained in the museum of St Bartholomew's Hospital, and which consisted rather of a description of the preparation, than of an account of the case. My friend Mr Benjamin Joseph Bell, however, on a recent visit to London, procured for me notes of the case, which enable me to state the following particulars respecting it.

The patient was a woman 48 years of age, of spare habit, and habitually costive. She was attacked on Friday, 23d December, with severe pain in the hepatic region, which continued, with constipation, till the 5th day, when she was first seen. She then complained of great pain and soreness over the whole abdomen, with incessant vomiting and great prostration of strength, her countenance anxious, pulse quick and small, tongue with white edges, dry and red in the centre. Purgative medicines were administered. She had a restless night; no evacuation. On the 6th day the pain continued. She was bled, had more purgative medicines and an enema. On the 7th day the symptoms continued, with stercoraceous vomiting. Saline effervescing medicine with salts and opium was administered, and her bowels were relieved for the first time. On the 8th day she was somewhat easier, but the stercoraceous vomiting still continued. A blister was applied to the pit of the stomach, and the effervescing medicine continued. The bowels were twice opened. On the 9th day the vomiting had nearly ceased. No alvine evacuations occurred from the 8th to the 12th day, when the bowels were moved. On the 15th, the vital energies appeared sinking, and she was ordered to have wine and mild nourishment. She rallied and continued to improve till the 19th day, when the surgeon was informed by the nurse that the patient's "seat" had come down. On examination, a large portion of intestine was found protruding at the anus. It had the appearance of ileum, and was withdrawn. The length was 42 inches. She had daily evacuations, assisted by enemata, till her death, which occurred on the 29th day.

On opening the abdomen, the left descending colon was immediately exposed, which, with the small intestines, was much distended by *flatus*. On raising the omentum and transverse arch of the colon, an ulcerated aperture was brought into view, through which a quantity of fecal matter had escaped into the peritoneal cavity. In several places of the colon there were abrasions of the mucous membrane. On measuring the small intestines, they were found to be ten feet in length, and free from disease. The *cæcum*, with the last portion of the small and first part of the large, intestines, presented a confused mass connected with the abdominal parietes by adhesive inflammation. On laying open the *cæcum*, an ulcerated opening appeared at the situation of the valve of the ileum, (a portion of which was remaining,) through which the piece of intestine had passed, with the upper part of the ileum adherent to the margin of the opening.

The cases which I have now for the first time to bring forward, I shall arrange in the same order as those narrated in the previous communication. They are the following.

Series I. Cases in which death had not taken place at the period of their being recorded.

36. (16 A.) Nic. Guil. Beckers de dolore ilei, ac corporis membranosi per alvum excretione. Ephem. Med. Phys. German. Dec. i. An. iv. and v. Obs. lxviii. p. 56.

37. (16 B.) Sur une portion des gros intestins, extraite par l'anus; par MM. Sebire D. M. et Gautier de St James, maitre en Chirurgie, &c. Journ. de Medec. Chirurg. et Pharm. lxiv. 619.

38. (16 C.) Sœmmering, Translation of Baillie's Morbid Anatomy into German, with notes, Berlin, 1820, p. 122.

Series II. Cases in which death had taken place at the time of their being recorded, but in which no dissection had been made.

39. (20 A.) Intus-susception intestinale suivie de l'excretion, par les selles, d'environ trente pouces d'intestin grêle, et d'une portion de mesentere. Observation de MM. Bouniol et Rigal fils. Revue Medicale, Aout 1823, xi. 476, and in Andral's Anatomie Pathologique, ii.

40. Meckel, Handbuch der Patholog. Anatomie, B. i. Th. i. s. 339.

Series III. Cases in which death had occurred, and a *post mortem* examination been made.

41. (35 A.) Chirurgische Geschichte, &c. von Leb. Ehreg. Schneidern; funft. theil, Chemnitz, 1771. (See Richter's Chirurg. Bibliothek, i.)

42. (35 B.) Case which occurred in the practice of Dr Forbes of Chichester, described by Dr Carswell in the Article Mortification in the Cyclopedia of Practical Medicine. The greater part of the intestine is preserved in the Museum of the Chichester Infirmary.

43. (35 C.) Cayol, as quoted at case 24.

36. A widow, aged 40, complained of a severe ulcerous pain of the right ileum, particularly at the time of going to stool, for which various remedies had been prescribed. She was put upon the use of a mild abstergent decoction, of baths, and of emollient and anodyne injections. These having been diligently employed for eight days, she passed by stool a membranous substance of the length and breadth of the thumb, open and ulcerated at one part but shut at the other, consisting of a triple coat, thin, fleshy, and rugous, and having a great resemblance to the *cæcum*. The discharge of this substance was accompanied with a small quantity of blood, of which there had previously been no trace. After this, she was seized with loss of appetite and constipation of the bowels, which could not be overcome, but on the ninth and following days, the bowels having been spontaneously opened, the appetite returned, and the patient was restored to her former state of health. From the nature of the pain and its seat, and from the structure of the excreted part, the author who relates this case was strongly inclined to believe that the substance discharged was actually the *cæcum*.

37. A man, aged 35, was attacked (13th April) with colic accompanied with fever; he had calls to stool twenty times in the course of the day, and passed clots of blood and mucus. At the time of his being seen, the gripings, which were felt only in the lower part of the umbilical region, had somewhat subsided; the pulse was small, contracted, and frequent; the face was pale, the eyes had a dark areola; and the tongue was covered with a thick yellow matter; the abdomen was tense and painful throughout all its lower part. The attack was regarded as of the nature of bilious dysentery, and treated accordingly. After the remedies had been continued for some days the condition of the patient was much improved, there was no longer blood in the stools, and the fever seemed to cease. The patient now became very irregular in respect of diet. On the evening of the sixteenth day of his disease, (28th April) after having passed several stools, he felt that his fundament had protruded. The surgeon on visiting him next day found that

a portion of intestine half-a foot in length had come out, which was sphacelated, cold, had a yellowish brown coating, and exhaled a cadaverous smell. The free end of this putrid body resembled a soft bladder, the base of which was larger than the part above, and exhibited an aperture into which the whole length of the finger could be introduced. The dejections had taken place for some days involuntarily, and were very fœtid, the pulse was small, the tongue dry, the colour leaden, and the whole of the body cold, but the mental faculties were entire. On the subsequent day he continued much in the same state, though in some respects improved, the pulse being better, and the anus, which had been well fomented with wine, appearing healthy throughout its whole circumference. The whole sphacelated portion exterior to the anus having been cut off, and an incision been made into it, it was found to consist of a fleshy mass, vascular and sarcomatous, and of the size of an egg, which adhered incompletely to a membranous sac. A second portion was then pulled out, and cut off; and, lastly, a third portion was drawn away without tearing, which was found to have no adhesions whatsoever. The patient went to stool and had a satisfactory alvine discharge, and an enema which was administered caused no pain, but brought away a quantity of bilious matter. The patient made a good recovery, and on the 12th of June following, he was as well as possible, with the exception of a slight pain felt in the abdomen after eating.

On making an accurate examination of the substance that had been extracted, after a longitudinal incision had been made throughout its whole extent, the following points were satisfactorily ascertained, 1*st*, That it consisted of a portion of the colon eighteen inches in length, the substance of which was not so much destroyed by the sphacelus, as to prevent its cells from being still distinctly seen, as well as the ligament by which it is attached to the mesentery, throughout its whole length. This portion was inverted like a glove. 2*d*, The cellular and fatty adhesions of the colon were distinctly perceptible, their gray colour not being effaced. 3*d*, The mucous membrane with which that intestine is lined interiorly had become black: And 4*th*, The coats of the intestine, in consequence of the mortification, could easily be separated from one another.

88. Soemmering mentions, that he possesses three preparations of what appear to him to be portions of large intestine, which were discharged by stool, in a case of inguinal hernia, in which the bowel had become gangrenous, adherent and incarcerated, but in which recovery took place. The surface of each part amounts, he says, to about two square inches.

SERIES II. 89. M. Andral mentions that, in examining a preparation sent to the Academy of Medicine, by MM. Bouniol and Rigal, he satisfied himself that it was a piece of the small intestine about thirty inches in length, accompanied with a portion of mesentery. It had been passed by a man who, after a violent indigestion of twelve days continuance, was affected with the symptoms of internal obstruction, complete suppression of the alvine evacuations, vomiting of stercoral matters, and in whom, in the right iliac region, a very obvious swelling could be felt. After the discharge of this substance, these symptoms suddenly ceased, and the patient had now only a somewhat painful sensation in the right iliac region. Three months afterwards, this man having eat a large quantity of cherries, was seized with peritonitis, and died. Unfortunately no examination was allowed, in which, M. Andral conjectures, there would probably have been found a laceration of the cicatrix, at the part from which the portion of intestine had separated.

40. In the notes of the preparations contained in Professor Meckel's Museum, which I took during a short visit to Halle, in 1825, I find the following entries. "'*Intussuscepta tenuis et crassi pars, dysenteria excreta.*' '*Intestini tenuis portio inversa gangræna ejecta, salva ægri vita.*' One of these is not quite so long as the specimen from Tranent, (Case 10,) and the other is considerably longer."

In his Manual of Pathological Anatomy, Professor Meckel mentions the case of a girl, 17 years of age, in whom, four weeks after the commencement of a fever, which was attended at first with constipation, and afterwards with diarrhœa, there took place the separation of the *cæcum* and *appendicula vermiformis*, and afterwards of the whole transverse and ascending colon, with a portion of the ileum, thirteen inches in length, which had been for a week so far intus-suscepted, that these parts protruded out of the *anus*. The girl, he adds, did not die for four weeks.

SERIES III. 41. A girl who had been delicate from infancy, was seized when seven years old with fever and severe pains in the abdomen. In the region of the loins was felt a pretty hard swelling, of the size of a goose's egg. Some time afterwards, a violent diarrhœa came on, by which a quantity of purulent matter mixed with blood, and at length a skinny substance, was discharged. This consisted of the whole *cæcum* with the vermiform appendix. The patient upon this became somewhat better; but was at last carried off, by fever, cough, frequent vomiting, and severe diarrhœa, by which purulent matter and undigested food were discharged from the bowels.

On opening the body, all the intestines were found in an unnatural situation, and there appeared traces of a volvulus having occurred in the *ileum* and *cæcum*; for, says the narrator, the *cæcum* and a part of the *ileum* had entered into the colon, and this invaginated portion had been discharged by stool, without an opening in the intestines being thereby produced, or any stoppage of the contents of the alimentary canal.

42. A woman, aged 31, had been confined to bed by an anomalous chronic affection for many years. In 1826, a portion of intestine came away, and from that time to the year 1829, there were no fewer than eight portions of intestine passed by stool, varying from eleven to thirty-two inches in length, the length of the whole amounting to twelve feet of entire intestine. Each portion was complete in itself, presenting in fact the appearance of healthy intestine that has been allowed to remain for a certain length of time in alcohol. They consisted of the *jejunum* and *ileum*, some of them having their serous, others their mucous surface outwards, on the former of which the blood-vessels, on the latter the *glandulæ agminatæ*, were most conspicuously visible. The patient recovered completely, at least from the immediate consequences of this disease. She died in March 1831, aged 37 years.

On examination after death, the form and dimensions of the intestine at the point where the solution of continuity had taken place, were found to have undergone very little alteration. A slight contraction of the small intestine, and the presence of a thin pearly-coloured false membrane, little more than half a line in breadth, and surrounding it in the form of a zone, were the only external appearances which indicated the original seat of the disease. On the corresponding and internal surface of the intestine there was also seen a narrow, slightly elevated, smooth ridge, covered by mucous tissue, and traversing the whole circumference of the intestine, the walls of which, opposite, were considerably thickened.

The solution of continuity had taken place in the situation of one of the glands of Peyer, and in such a manner, that this gland was divided into two nearly equal portions, one of them terminating in the cicatrix, and the other being situated at the extremity of one of the detached portions of intestine.

43. A man, aged 47, had been troubled for fifteen years with an inguinal hernia on the left side, for which he wore a bandage that did not fit him, but allowed the hernia, which he could easily reduce, to descend. On the 10th of July, on his making a sudden effort, the bandage became displaced, and the tumour quickly became tense, painful, and irreducible. In this state he walked a league and a-half, suffering severe colic; after which, the tumour having acquired a brown hue, he lay for three days affected with colic, hiccough, borborygmus, ster-

coraceous vomiting, and complete suppression of the alvine evacuation. He appeared to be in a sinking condition, and gangrene was supposed to have taken place in the hernial sac. After remaining in this state for two weeks, the bowels were relieved by enemata, and the patient became much better; five or six days afterwards, however, there was an exacerbation of the symptoms, but this also declined. In a month the tumour became less hard, and the skin covering it resumed its natural appearance. During the next four months he was subject to flatulence and colic, was habitually constipated, but every ten or twelve days had an attack of diarrhœa, which weakened him much. From time to time he had stercoraceous vomiting. He eat and drank to excess. About the end of November he was tapped for hydrocele below the original tumour, and the limbs soon afterwards became œdematous; he continued still very much distressed with flatulence. On the 2d of January, about midnight he suddenly sank, and the breathing soon becoming stertorous, he died early on the following day.

On dissection, the hernial sac was found thickened and very dense in texture. On being opened it was found to contain a portion of epiploon, the lower extremity of which was pretty thick, and adhered very firmly to the bottom of the sac. Behind this portion of epiploon was a fold of intestine, from four to five inches in length, the extremity of which, forming an acute angle, adhered also very firmly to the bottom of the hernial sac, and to the portion of epiploon already mentioned.

At the place of this adhesion the intestine was considerably contracted, and as it were strangulated; on opening it cautiously, it appeared that its cavity could scarcely contain the end of the small finger, and on the mucous membrane there could readily be distinguished a cicatrix, the breadth of which varied from half a line to a line and a-half. The broadest part of this cicatrix corresponded to the centre of the adhesion between the intestine and the hernial sac, and opened into a small *cul-de-sac*, that might be compared, in respect of form, to the vermiform appendix of the *cæcum*, four to five lines in length, and immerged between the *parietes* of the sac and the adherent portion of the epiploon. This small *cul-de-sac*, which contained a little blackish mucus mixed with fecal matters, appeared at first to be formed by a prolongation of the *parietes* of the intestine; but on accurate examination, it was found that the intestinal coats, instead of being prolonged into its interior, terminated insensibly in the circumference of its aperture, so that the intestine was actually pierced. The *parietes* of the *cul-de-sac* were smooth interiorly, like most old fistulous cavities.

The cicatrix became more and more narrow, the further from the orifice of the *cul-de-sac*, and at last, at the opposite extremity of the diameter of the intestine, it was quite linear, and slightly prominent. It appeared that at this part the upper end of the intestine was slightly invaginated into the lower, whilst throughout the rest of the cicatrix the two ends did not appear to have come into immediate contact. The small interval left between them presented to the eye a broad and well-marked furrow, though of small depth, and differing little, in respect of colour and appearance, from the rest of the mucous membrane. On the external surface of the intestine, the traces of the cicatrix were not very distinctly perceived, in consequence of the adhesion of the epiploon and hernial sac. In destroying these adhesions it was impossible to avoid tearing the cicatrix, because, besides its adhesions, it was much weaker than the rest of the *parietes* of the intestines.

The fold of intestine contained within the hernial sac was formed by the commencement of the *ileum*. Neither it nor the portion of epiloon had any adhesions with the inguinal ring, which was very large. Above the seat of the hernia, the bowels were dilated; below they were much diminished in their diameter.

From a consideration of the symptoms which occurred during life, and of the appearances found after death, and a comparison of the case with that related by M. Mullot, (Case 24,) the author is disposed to believe that a portion of strangulated bowel had been separated and discharged in this case, though its discharge was not noticed at the time of its occurrence.

Mr Travers has related a case respecting which he entertained a similar suspicion. *

In the remarks which I offered in my former communication, on the mode in which the separation and discharge of a portion of the cylinder of the intestine may be effected, I regarded this occurrence exclusively as a consequence of intus-susception. On farther consideration, and particularly on a more attentive examination of the experiments by which the processes of nature in repairing injuries of the intestines have been illustrated, I am disposed to think that in some cases it may occur independently of intus-susception. "It is by no means improbable," says Mr Travers, † "that of the cases in which portions of disorganized bowel have been voided *per anum*, some have been internal herniæ, arising from malposition or laceration of the mesentery or omentum, or the production of such ligamentous bands as we sometimes find crossing old hernial sacs." To the same purpose Professor Meckel observes, (Loc. cit. ii. i. 340.) "It does not follow that, in all the cases in which parts of the intestinal canal have been detached and expelled, intus-susception must have occurred. In treating of herniæ, I shall have occasion to mention several cases in which, without intus-susception, a considerable portion of intestine separated, and still the continuity of the intestinal canal was not injured. But the same thing may happen also when, by previous inflammation, the intestinal canal has become adherent at several places to the parietes of the abdomen. In this case it is possible that parts of the canal naturally distant from one another may become adherent, and the part between them mortify and be detached without having been previously intus-suscepted and inverted." In illustration of this view Professor Meckel refers to Mr Bower's case (No. 5.) As in this case there occurred several external apertures, in the circumference of which the intestinal canal was obviously attached to the parietes of the abdomen, be thinks it possible that a portion of intestine may have come away, and the apertures between the upper and under parts of the alimentary canal been filled up, partly by coagulable lymph, and partly by the mesentery and the parietes of the *abdomen.*

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* Inquiry into the Process of Nature in Repairing Injuries of the Intestines, p. 348.

† Ibidem. Note.

The two methods by which nature may be supposed to get rid of a portion of bowel in the progress of disease, are well illustrated by what occurs in two forms of injury intentionally inflicted; 1*st*, when a ligature is simply tied round the cylinder of the gut; and 2*d*, when a knuckle of gut is included in a ligature, so as to produce its detachment, by sphacelation, from the rest of the canal.

"A ligature fastened around the intestine," says Mr Travers, "divides the interior coats of the gut, in this effect resembling the operation of a ligature upon an artery. The peritoneal tunic alone maintains its integrity. The inflammation which the ligature induces upon either side of it is terminated by the deposition of a coat of lymph exterior to the ligature, which quickly becomes organized. When the ligature thus inclosed is liberated by the ulcerative process, it falls of necessity into the canal, and passes off with its contents. It is much in this manner," continues Mr Travers, "that the disease termed *intus-susceptio*, in which one portion of the gut is enveloped and strictured by another, not unfrequently undergoes a natural cure. The adhesive inflammation preceding the separation of the disorganized part, forms a channel by which the slough is voided."

But if, instead of simply surrounding the intestinal canal by a ligature, this be applied in such a manner as to include a knuckle of intestine within the noose, there seems reason to believe that, under favourable circumstances, the portion of bowel which loses its vitality may be discharged through the alimentary tube, just as in the cases which we have been considering.* It is obvious that in this experiment we produce a state of intestine very accurately corresponding with that of hernia, and that, in fact, in the language of Mr Travers, "what an intus-susception is in relation to the single tube, the hernia is to the fold."†

"The stricture upon a knuckle of the intestine," says that author, "operates upon the same principle as the ligature of the single tube. If it is formed within the *abdomen*, the process is more hazardous (than in the case of the single tube,) because a larger portion of dead matter requires to be enveloped, and consequently the adhesive inflammation must extend further, to prevent effusion. The walling in of the whole fold, including the strictured portion, is the first step of the process; the disengagement of the dead part by ulceration and its discharge by the canal are consentaneous with the organization of the adhesions. The villous surface presents a horizontal groove, marking the line of division. In the ordinary situation of hernia, the portions of intestine embraced by the stricture occupy a position nearly parallel. Their contiguous sides mutually adhere; in the remainder of their circumference, they adhere to the peritoneum lining or forming the stricture. The existing adhesion of the contiguous sides, strengthened by the adhesion of the parts in contact, insures a partial continuity, upon the separation of the sphacelated part. The line of separation is the line of stricture. It commences on that side of the gut which is in direct contact with the stricture. As the separation advances the opposite adhering sides may perhaps recede somewhat, and a little enlarge the angle of union. But it is ever after an angle; and where the peritoneum is deficient, the canal is simply covered in by granulations from the cellular membrane of the *parietes* coalescing with those of the external or cellular surface of the peritoneum."—P. 360.

It seems reasonable to suppose that what nature is able to accomplish in cases in which the separation of portions of the intestinal canal has been effected by experimental ligatures, she may also, and perhaps still more readily, effect when the separation is occasioned by disease, and therefore that cases of the kind which it has been the object of this and my former communication to bring together, may occur independently of intus-susception.

Of the 19 cases that I have collected, in which dissections have been made, are there any in which the *post mortem* appearances give us reason to believe that the separation of the portion of intestine had been effected independently of intussusception? Without attempting at present to reply to this question, I beg to refer it to the consideration of the reader, whether this may not have happened in cases 23, 27, and 29.

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* See Mr Travers's Experiments X and Y, pp. 342, 345.

† Loc. cit. p. 345.

I have now to direct attention to the considerable number of cases of Hernia and of Dysentery, in which the separation and discharge of a portion of the intestinal canal have occurred. In my former communication I gave an account of a case (24th,) in which this accident succeeded to the employment of a considerable degree of force, in the reduction of an umbilical hernia,—a case quoted by M. Cayol, the French translator of Scarpa's work upon hernia, in a "memoir on a particular termination of gangrene in cases of hernia," which he has annexed to that work. In the present communication I have noticed a case of inguinal hernia, alluded to by Soemmering, in which portions of the large intestine were discharged by stool: and I have quoted also from Cayol another case (43,) in which there appears conclusive evidence to show that a spontaneous cure was effected in a case of inguinal hernia, by the separation and discharge of a portion of bowel. It does not, I may remark, however, necessarily follow, that in cases of hernia in which a portion of bowel is discharged by stool, the separation occurred independently of intus-susception. In case 24, the appearances found after death seem to prove very clearly, that intus-susception had been the immediate cause of the separation of the portion of bowel which was discharged.

With respect to the discharge of a portion of intestine during the progress of dysentery, I quoted a case of this kind, in my former communication, from Mr Twining's Clinical Illustrations of the Diseases of Bengal, and a passage in which the author mentions having seen five cases of this sort in eight years. I referred also to some preparations of portions of intestine passed *per anum*, contained in the Museum of the Army Medical Department at Chatham, which, from their having been transmitted from India, I was inclined to suppose, might also have been the consequences of dysentery. Of one of these, I find a delineation has been published in the second fasciculus of the lithographic drawings from the preparations in that establishment, Plate VII. Fig. 9. From the account given in the present communication, of case 11, it would appear that it ought to have been considered as a dysenteric case; and to these we may add the case of MM. Sebire and Gautier (37), and one of the preparations in Meckel's Museum. (p. 380.) These cases would seem to show, that in the morbidly increased peristaltic action of the intestinal tube, which occurs in dysentery, invagination is very liable to occur.

But in admitting the occurrenee of this accident in cases of dysentery, particularly when no *post mortem* examination has taken place, it is necessary to be on our guard against two sources of error. 1*st*, Portions of intestine, not comprising the whole thickness of the bowel, may be detached in the progress of this disease from the inner surface, and if a separation of this kind extends over the whole circumference of the tube, a careless observer may fail to notice in the portion discharged, the absence of the exterior coat or coats; but 2*d*, during the progress of dysentery, it not unfrequently happens that a layer of unorganizable coagulable lymph is deposited on the inner surface of the intestinal canal, and subsequently discharged by stool, resembling those layers which occasionally form on the inner surface of the larynx, trachea, and bronchi. If such layers assume a tubular form, the incautious may very readily mistake them for portions of the intestinal canal. These are occurrences, however, which it is my intention to make the subject of future communications.

I have only farther to add at present, that the cases recorded in the present communication afford several instances of an occurrence not formerly noticed, viz. the protrusion of the invaginated portion of intestine at the fundament during life. (14, 33, 37, and 40.)

ART. VIII.—*On the Effects of Venesection in renewing and increasing the Heart's Action under certain circumstances.*

By JOHN REID, M. D. Demonstrator of Anatomy, President of the Royal Physical and Medical Societies of Edinburgh.

I HAVE observed in several experiments on the lower animals, that disgorging the right side of the heart, when its contractions are enfeebled or suspended, by opening the external jugular, has in some cases a decided effect in renewing its action, which I am convinced may be of considerable practical advantage in promoting the return of the circulation under certain circumstances.

1*st Exper.* While assisting my friend Mr Cormack in some experiments upon the physiological effects of Creosote, we found, on opening the thorax of a dog, into whose femoral vein 25 drops of creosote had been injected, immediately after it had ceased to breathe, that the heart was perfectly quiescent, and remained so even when pricked and cut superficially with a scalpel. As the right side of the heart appeared much engorged, a small opening was made into the auricle, and part of the blood allowed to escape. As soon as the blood began to flow the heart immediately resumed its contractions, and continued to act vigorously and spontaneously between two and three minutes, and only ceased after five minutes. The same quantity of creosote was injected into the jugular vein of another dog. On exposing the heart it was perfectly quiescent, and refused to contract when irritated. On emptying the right auricle of part of its blood, it gave two or three contractions, and then ceased.

The poison appeared to have acted more powerfully and rapidly in the last dog than in the first. On applying the hand over the chest of the first dog, an irregular fluttering was felt for a short time after the creosote had passed into the vein, while in the second dog the action of the heart was never felt after it had fairly entered the vein. It is important to remark, that the respiration continued for a short time after the heart's action had become arrested.

Struck with the effect which disgorging the right side of the heart had in renewing its contractions under circumstances where no external stimulus was of any avail, I was anxious to ascertain if the same results would follow the unloading of the heart when arrested from other causes.

2d Exper. Three dogs were killed by hanging, and as soon as they had ceased to breathe, the thorax was laid open. In all of them the heart was acting pretty vigorously, particularly in one of them, which was only a few months old. When the contractions had become feeble the external jugular vein was opened. This was followed by a decided but temporary increase in the contractions of the heart in two of them, which were large and full-grown. In the third and young dog the effect was very trifling. The opening of the external jugular was found rapidly to empty the right side of the heart.

The marked difference between the results in the first experiment and those which follow, can, I think, easily be explained. It is well known that there are several poisons which produce death by arresting the contractility of the heart, and Mr Cormack's experiments* show that among these creosote must be placed when injected into the veins. When these poisons are administered in sufficient quantity, they destroy at once and for ever the irritability of the heart, and no remedial agent can be of the slightest avail. We can, however, easily suppose, and facts could be adduced in confirmation of it, that the substance may be given in a quantity merely sufficient to act transiently upon the heart, so as to diminish or arrest its contractility for a short time only; it would appear that after the action of the poison begins to pass away, and when the contraction of the heart would be renewed, it has, during the temporary suspension of its contractility, become so much engorged with blood, that no external stimulus can excite it to action, until it has been first emptied of part of its blood. The more rapid action of the poison in the second dog, in which the renewal of the heart's action was to a trifling extent compared with the first, is in exact accordance with this view. In death from asphyxia the contractility of the heart appears to be but little affected at first, but gradually ceases after the circulation through the lungs has been suspended. And though the right side of the heart, as its contractility diminishes, becomes so engorged with blood that its contractions are suspended, and though opening the jugular vein, if not deferred too long, has generally the effect of relieving the right side of the heart of part of its blood, and renewing its contractions, yet we cannot expect the same decided results, as in those cases where the action of a deleterious agent has produced a temporary and fleeting effect upon the contractility of the heart.

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* The results of Mr Cormack's accurate and laborious investigations on this substance will be published before this Number of the Journal can appear.

3d Exper. While witnessing, along with my friend Dr J. Y. Simpson, the effects of prussic acid upon some dogs doomed to death at the Police-office, on applying the hand over the chest of a dog, immediately after it had ceased to breathe, to whom a large dose of the acid had been given, the heart was felt beating slowly and irregularly. On opening some of the vessels at the lower part of the neck, among which was the external jugular vein, the action of the heart instantly became rapid, regular, and stronger.

4th Exper. A rabbit was killed by a large dose of strychnia. When the heart was exposed its contractions were slow and labouring. On opening the jugular vein, the right side of the heart began to disgorge itself, and this was accompanied by a very decided increase in the number and strength of its contractions.

5th Exper. Two rabbits were killed by a blow on the head sufficient to injure a portion of the brain. On exposing the heart, its movements were feeble, and the right side of the heart was engorged. The escape of blood from the external jugular was followed by a decided increase in the number and strength of its contractions, which lasted for a considerable time.

6th Exper. I was now anxious to ascertain what influence artificial respiration, by favouring the passage of the blood through the lungs, would have in renewing or increasing the contractions of the heart in these cases. These experiments (six in number) were performed upon rabbits, and were far from being so satisfactory as I could have wished. We, however, saw sufficient to lead us to believe that though in cases of asphyxia, the artificial inflation of air into the lungs is sufficient, as numerous experimenters have ascertained, to renew the circulation through the lungs, if commenced when the contractions of the heart are still going on pretty vigorously, yet if these are less active, they may be assisted by disgorging the right side of the heart.

I have thought that, instead of prosecuting the subject farther experimentally at present, for the purpose of endeavouring to ascertain the extent of its application to the human species, I should leave it in the hands of those practical men, who have ample opportunities of putting it to the test of experience, if they should think it worthy of their consideration.

In these experiments I was assisted by Dr Pollexfen, Messrs Cormack, Skae, and G. Newbigging.

Bleeding from the external jugular vein has been long practised in all cases of asphyxia. Though some may still open this vein in these cases for the purpose of relieving congestion of the brain, it cannot act in this manner, since accurate dissections have shown that no such congestion exists; so that the principal object in bleeding in asphyxia must be to renew the heart's action. * It is with this view alone that some men recommend its use. To produce this effect, the best plan (to judge from the experiments which we have detailed,) is to open the jugular vein and encourage, by all possible means, provided that no air be allowed to pass into the vein, the flow of blood from the lower orifice, and from the lower orifice alone, if we are anxious that much blood should not be drawn. By pressing upon the lower orifice, as is usually done, the blood will be prevented from regurgitating from the right side of the heart, and the most effective method in which blood-letting can favour the renewal of the contractions of the heart will be lost. † Conducted in a proper manner, we believe that in many cases it may act as a valuable adjuvant to the artificial respiration, friction with warm flannels and other remedies which are put in force to restore suspended animation.

The experiments of Legallois show, that injuries extending to a considerable portion of the spinal chord kill by arresting the heart's action; and Wilson Philip has also proved that the same effect follows similar injuries of the brain. On the other hand, injuries of a circumscribed portion of the brain kill by destroying the sensation, the action of the heart being only arrested by the impediment to the passage of the blood through the lungs from the cessation of the respiration. We have here the important distinction between the nature of concussion and compression. No doubt, these are generally intermixed in in-

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* Though it can have no effect in diminishing the quantity of fluid within the cranium, it may yet assist in removing any irregularity in the distribution of the blood induced there during the disturbed state of the circulation.

† Though the external jugular vein in the human species has pretty generally a valve near its termination, and occasionally another about its middle, yet these rarely present any decided obstacle to the passage of fluids from the heart.

juries of the brain, but the symptoms of the one may preponderate over the other and demand its appropriate treatment. Many surgeons are decidedly opposed to the extraction of blood during the stage of collapse from concussion, when the pulse is small, rapid, and feeble. But we can easily suppose that during its weakened state, the blood which continues to flow along the veins, may embarrass the action of the right side of the heart, and interfere with the recovery of its contractility, and that opening the jugular vein, and allowing a few ounces of blood to escape from its lower orifice, would in some cases materially assist the action of the other remedies. There may be even a few rare cases in which the injury done to the central organs of the nervous system, may be just sufficient to arrest the contraction of the heart for a short time, and thus resemble the effects of the poison in the first experiment, where stimulants would be of no avail in restoring the heart's action, until the vein was first opened, and where, under proper management, the circulation might be restored.

Sir B. Brodie and others have shown, that poisons produce their fatal effects in one of two ways, either by suspending sensation, or by arresting the contractility of the heart,—in other words, inducing death in a manner similar to compression and concussion.* In these cases, where the action of the poison has only been sufficient to enfeeble transiently the contractility of the heart, opening the jugular, and allowing the blood to escape from the lower orifice, must materially assist the renewal of the heart's action. Of course, care must be taken that we do not, by the withdrawal of a certain quantity of blood, favour the absorption of the poison. It is, however, evident, that we can only expect a decided effect from the blood-letting in those cases, where the action of the poison has been transient, and where, either from the manner in which it has been applied or from the interference of art, no repetition or renewal of its action can take place. The flow of blood from the lower orifice of the jugular vein when opened appears to depend upon two causes. 1*st*, Upon the contractions of the right side of the heart, more particularly when the blood in the veins is nearly stagnant, and the heart is congested. At each contraction, the heart attempts to force a certain quantity of blood along the vessels connected with it, and as there is no *vis a tergo* to prevent the action of the heart, moving the blood along the veins in its immediate neighbourhood, a certain quantity is forced out through the opening in the jugular. This I have often witnessed. During the congested and enfeebled state of the heart, the blood passes readily from the ventricle into the auricle, as Haller has remarked. 2*dly*, Upon the principle of derivation, as laid down by Haller, to whose observations upon this subject my attention was directed by Dr Alison, after I had commenced these experiments.

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* For an admirable exposition of the action of the causes of sudden death, see the second chapter of Dr Alison's Outlines of Pathology.

Haller[*] ascertained by repeated experiments upon the lower animals, that when a vein is opened, the blood rushes towards the opening on the proximal side of the heart as well as on the distal, and from the veins communicating with the opened vein; that this in some cases extended to the neighbouring arteries after the blood had ceased to flow through them, and even after the blood appeared thickened in the veins; that, as the blood continued to flow, the globules resumed their figure and their natural mobility. All this was found to take place independent of the heart, and after the aorta had been tied. These experiments were confirmed by Spallanzani.[†] Haller, as appears from different parts of his works,[‡] was fully aware, that opening the jugular vein would empty the right side of the heart, and so assist the renewal of the circulation in asphyxia. He seems, however, to have attributed this entirely to the derivation of blood, as neither the account of the experiments themselves, or in the deductions from these, does he make mention of the contractions of the heart. He was also aware, that congestion of the right side of the heart arrested its contractions sooner than if it had remained uncongested, but he makes no mention of the effect of unloading the heart in renewing its movements.[§] Indeed, the experiments of Haller and Spallanzani on the derivation of blood, made on the large veins in the neighbourhood of the heart, seem to have been liable to a source of fallacy in the renewal of the heart's action, of which they do not appear to have been aware. This could not, however, affect the accuracy of the other experiments made on other parts of the body upon this subject by those two distinguished individuals.

Since the engorging of the right side of the heart arrests its contractions sooner than they otherwise would stop, it will be necessary to bear this in mind in experimenting on the length of time during which the heart remains contractile after death, as the circumstance of the large veins being cut or kept entire, in laying open the thorax, may considerably modify the results.

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[*] Sur le Mouvement du Sang. Opera Minora, Tom. i. p. 99.

[†] Experiments on the Circulation of the Blood. Translated by R. Hall. M. D., p. 387.

[‡] Sur le Mouvement du Sang, p. 103–104. Elementa Physiologiae, Tom ii. p. 349.

[§] Memoires sur la Nature Sensible et Irritable des Parties du Corps Animal, Tome i. p. 378.

ART. IX.—*History of the Developement of the human Ovum, with a comparative view of the Developement of the Ova of Mammalia and of Birds.* Translated and abridged from the German of Dr G. VALENTIN,[*] of Breslau, by MARTIN BARRY, M. D., M. W. S., President of the Royal Medical Society of Edinburgh.

I. *The unimpregnated Ovum as contained in the Ovary.*

THE ovum of the higher classes of animals contains, while it is in the ovary before impregnation, the following different parts, some of which undergo changes or disappear at the time when, in consequence of conception, the ovum leaves the ovary; others continue.

1. An external membrane enclosing and circumscribing the ovum, the membrane of the yolk, yolk-bag.
2. A more or less fluid content, the yolk.
3. A peculiar layer of granules, more or less widely spread over the surface of the yolk; the blastoderma.
4. A transparent vesicle filled with a pellucid lymph, imbedded in the centre of the blastoderma, lying on the internal surface of the membrane of the yolk, the germinal vesicle called also the Purkinjean vesicle, after its discoverer Purkinje.

The ovum receives from the ovary itself also,

5. A membranous envelope, consisting of a granular layer and a viscid matter united,—in which lie the blood-vessels; and
6. A covering, that proceeds from the substance of the ovary, for the most part granular, tough, compact and dense.

The egg of the bird, as best known, will serve as a basis for research, a standard with which to compare the results of investigations in the Mammalia and in Man. We follow in this the researches of Purkinje,[†] in some of which we have ourselves taken part, while the correctness of others, we can from our own observations confirm,—and in a very small degree extend the results.

If the smallest ova in the ovary of a bird be examined, for example that of the domestic fowl, they are found of a pretty decidedly spherical form, and grayish-white in colour. The external enclosing membrane, as well as the lamella of the blood-vessels, it is very difficult to separate from the membrane of the yolk;

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[*] "Handbuch der Entwickelungsgeschichte, &c."
The present article contains a part only of Dr Barry's translation of this work. It is intended to publish the whole of this translation soon in one volume. Dr G. Valentin has lately been awarded the Great Prize in the physical sciences, by the Academy of France, for a Memoir on a subject closely connected with that of the present work.

[†] Symbolae ad ovi avium historiam ante incubationem. Wratisl. 1825, ed. alt. Lips. 1830. 4.

and if this be accomplished, there is nothing perceived but a finely granulous opaque substance, which constitutes the whole content of the ovulum. If crushed by pressure, however, between two plates of glass, the perfectly transparent, and to all appearance structureless membrane of the yolk may be separated from its content. The latter consists of a fluid mass, which contains an immense number of very minute, decidedly round particles. The size of these transparent particles is so small, that they exceed but little that of the molecules of Brown. These granules, as Gruithuisen has observed, and which our own observations confirm, very often present molecular motions. In larger ovula, the homogeneous transparent mass, which unites the granules, is found to have increased in quantity, and to have assumed an oily consistence. This is shown partly from the fluid having acquired a higher degree of tenacity, and from the appearance in it of single round drops, like drops of oil or fat; partly also from these isolated globules, as well as the whole ovum, having received a more saturated yellow colour. This content is then usually called the yolk of the egg. More minutely considered, the yolk of the bird consists partly of the primary, very minutely granulous mass, partly of an oily matter. This enlightens us as to the condition of the ova of the Mammalia as well as of the lower vertebrated animals. In the latter, namely, these two substances are not mixed, as in birds, but more or less separated. Thus, in the ovum of fishes, as well before as during the impregnation and developement of the embryo, there is found a viscid mass containing granules, which is generally called the yolk, and a drop, or several drops of oil, which perform an important part here during the whole period of evolution, as Cavolini, Carus, Rathke, and others, have observed, and as we shall, in another place, more particularly describe. In the ovum of the Batrachian reptiles, there are found single drops of oil, enclosed in an exceedingly granulous fluid mass. This has been observed also in the Ophidian and Chelonian reptiles. Of the Mammalia and Man, we shall presently speak more fully.

Besides the yolk and the membrane of the yolk, there are to be distinguished in somewhat larger ovula in the ovarium of birds, the germinal vesicle and the blastoderma, so that all the abovementioned parts of the ovum can be presented with distinctness in an isolated form. The diameter of the smallest ovulum, in which we found this possible was $\frac{1}{8}$th of a line. We shall now describe the individual parts, from these to the largest, *i.e.* to those found at the moment in which the ovum separates itself from the ovary to enter the oviduct.

1. *The membrane of the yolk* is a transparent and structureless membrane, which, indeed, in many cases, presents on its inter-

nal surface a layer of very minute delicate globules, but which probably, as we shall soon see, does not belong to the membrane itself. It encloses, exactly, the ovulum loosened from the parenchyma of the ovary, and increases in size with the ovum itself, so long as the latter remains in or upon the organ. In no part of it is there visible the trace of a cicatrix. It presents rather a continuous sac, closed throughout, and conforms in its external shape, entirely to that of the ovum generally, and of the yolk in particular. It is therefore in smaller ova, of a roundish or elongated, in larger, always of a decidedly spherical, form. Extremely seldom only, are there slight traces of fibres to be perceived in it.

2. *The yolk*, in an advanced stage of the developement, is a yellow fluid mass, of tolerably viscid consistence, and contains in the recent state a multitude of larger or more minute yellow globules of a decidedly spherical form, and of perfect transparency. Together with these globules, there is found distributed in it a multitude of smaller ones, which, as we have seen, precede in the time of their formation, the developement of the true globules of the yolk, but which are present in relatively larger quantity at an early than at a later period. Through the influence of a high temperature, of alcohol, &c. the yolk is changed into a firm crumbling mass, which in its individual parts presents not an altogether irregular outline, though the mathematically determined form of crystals is wanting.

If the yolk be cut obliquely with sharp scissors, there is found in its middle a substance, essentially differing from the true substance of the yolk. It presents itself with a more or less decided circumference, and Purkinje concluded, from the conformation of its outline, that this mass passed through a canal in the yolk, which proceeded, at first pretty narrow, from the cicatricula to the centre of the yolk, here assuming a vesicular, widened form. In the second edition, however, he expresses doubts regarding the correctness of this view. Although in the fluid mass of the yolk, it is scarcely possible to decide regarding the form which the matter, found in its centre, may there assume, yet so much appears certain, that within the yolk there is generally contained a substance heterogeneous to it, which, according to Purkinje, consists of a multitude of globules, larger than those of the albumen. In the boiled egg, this matter is of a milk-white colour, and has a saltish taste. But whether the space in which this substance is contained, and which in newly laid eggs is most distinctly recognizable, whether this space have the shape assigned to it by Purkinje, or the somewhat different form figured by Burdach and Karl Ernst v. Baer, may never with certainty be determined.

3. *The foundation of the Germinal membrane.*—In the ovum of the fowl which is so far advanced in its developement that it is leaving the ovary and entering the oviduct, there is seen through the membrane of the yolk a grayish white circular spot, which from early times has been known under the name of the macula or cicatricula. If the ovum be lacerated, and its content minutely examined, the cicatricula is found like a grayish white disk, which in its whole periphery is dense, granulous and opaque, but in the centre presents a clear non-granulous, and perfectly diaphanous point. This observation was made so long since as by Fabricius ab Aquapendente, Harvey, and others, and has been repeated with ease by very many other naturalists. Purkinje, who, in 1825, again entered upon researches on the unincubated egg of the bird, was so fortunate as to place the relation of this transparent, non-granulous point in a clearer light. He found, namely, that when he removed the dark granulous mass, by suction with a small tube, there remained a perfectly transparent vesicle, filled with a pellucid lymph, which had a decidedly spherical form, but being extremely delicate, was very easily lacerated, and its fluid escaped. As he found this, which later naturalists have named, after its discoverer, the Purkinjean vesicle, in the ova of the ovary, but could not see it in ova which had already entered the oviduct, he assigned to it the name of germinal vesicle. This germinal vesicle is imbedded in the granulous layer of the cicatricula, so that the latter forms a depression around it, but which depression, viewed from above, appears like a circle, surrounding the vesicle. With that portion of its surface directed outwards, the germinal vesicle touches the internal surface of the yolk-bag, without being organically connected with it. The disk which surrounds it consists of many minute granules, lying closely together, and united by a transparent, tenacious matter, appearing at first sight circumscribed in the form of a round or oval disk. But when this disk is examined with aplanatic lenses, while within the uninjured ovum, it appears probable that the granulous layer lying on the internal surface of the yolk-bag is a continuation of the disk, the granulous layer, situated between the yolk-bag and the yolk itself, every where embracing and enclosing the latter. The granulous membrane,—its thickened portion, the so-called cicatricula,—and the germinal vesicle, constitute those parts of the ovum which pass immediately into the original foundation of the embryo, the blastoderma or germinal membrane. We shall therefore assign to the tout ensemble of the parts now mentioned, the name of *Germinal membrane* (Keimanlage,) distinguishing in it,

1*stly*, *The granulous layer under the yolk-bag.*

2dly, The cicatricula or thickened portion of this layer; and
3dly, The germinal vesicle.

If it be easy to exhibit the three parts constituting the germinal membrane in large ova, a perception of them on the other hand, in the smallest ovula of the ovarium, is attended with almost endless difficulties. For the little, delicate vesicle, the germinal vesicle, bursts with every, even the most careful, manipulation; the granulous layer, lying internal to the yolk-bag, is scarcely with certainty distinguishable from the remaining content of the ovulum, (which as yet presents no yolk-granules) especially as the thickening of the same, in the neighbourhood of the cicatricula, is still entirely wanting, or very inconsiderable. It is remarkable, however, and a certainly established fact, that the germinal vesicle is relatively largest, in the smallest ova in which it can be shown, and that even absolutely, it then has, upon the whole, but an inconsiderably less volume, than when the ovum in the ovary has reached its highest degree of developement. Purkinje found, in a series of micrometric observations, the following magnitudes.

Diameter in Vienna Lines.

	a. *the Ovulum,*	and b. *the Germinal Vesicle.*
1.	0,11000	0,05000
2.	0,12500	0,05500
3.	0,13125	0,06250
4.	0,14375	0,06875
5.	0,21875	0,10250
6.	0,22000	0,11256
7.	0,22500	0,10625
8.	0,23750	0,10750
9.	0,30000	0,12125

It is thus seen, from these relations in regard to magnitude, that the germinal vesicle, throughout, does not increase in size in proportion as the ovum grows, *i. e.* as the yolk especially acquires volume, but that at an earlier period, it is relatively larger than the yolk, and the outer envelope of the ovum, taken together. It is otherwise, however, with the cicatricula, or thickened disk, surrounding the germinal vesicle. The disk is wanting, or extremely delicate, when the germinal vesicle has already reached a considerable size and its destined form. Only by degrees, does the mass around the vesicle become thicker, so that it is in ova of one and a half to two lines in diameter, that, as a white spot on the yolk, the disk is first visible to the naked eye; whereas the germinal vesicle then already lies imbedded in the depression of this disk. The thin layer, lying on the internal surface of the yolk-bag, which is probably an attenuated continuation of the disk, then admits with some decision of being recognized, when the germinal vesicle is certainly to be perceived.

The foregoing contains, perhaps, the most important part of the history of the ovum of the bird, so long as it is found in the ovary, from the first moment of its origin until the time when it leaves the ovarial stratum, and the vascular lamella, contained within the latter, to pass into the oviduct. We thought it required, first, to give this sketch in order to be able to understand, and justly to estimate, the phenomena occurring in the ovary of the Mammalia and of Man. The former, the ovary, consists, namely, of the peritoneal covering, of a more or less fibrous couch, (stroma of Baer,) and of blood-vessels. In this substance there lie inclosed a greater or less number of spherical or spheroidal vesicles, the size of which is quite different in different animals, as well as in individual parts of the same ovary. Although this structure of the ovary was known before the time of Regner de Graaf, the latter has the merit of having with evidence, pointed out, that after every impregnation these vesicles, in number corresponding with that of the future embryos, burst, discharge their content, and are then changed into a fleshy, yellow, or reddish mass. Hence these structures were called *vesiculæ Graafianæ*, or more correctly, since de Graaf himself, in many places, used the expression, *folliculi Graafiani*. The analogy with the ovary of birds was in this manner, to a certain extent, established; for it was pointed out that in Mammalia, that organ which, sometimes after the older authors, was called *testes muliebres*, sometimes after Steno, *ovaria*, discharged after impregnation, a certain number of ovula into the tubes like the ovary of birds. In the next place, it was to be maintained that the Graafian vesicles themselves were these ovula, as also in the ovary of birds, the yolk acquired very considerable volume before it passed into the oviduct. But Regner de Graaf himself had found, by a series of experiments on the first effects of impregnation in rabbits, that the ovula, in the earliest days after conception, so long as they were contained in the tubes, or in the horns of the uterus, were much smaller than the Graafian vesicles, especially as the latter, immediately after a fruitful connection, increased considerably in volume. He had therefore arrived immediately at the negative result, that the vesicles of the ovary themselves could not be the ovula passing over into the uterus. On the contrary, they burst at their point of greatest size, discharged their content, hence contained in the first place a cavity in their centre, and were gradually changed, as this cavity became filled up, into the *corpora lutea*. The next question then was, whether the folliculi contained in themselves the far smaller ovula, or only discharged a fluid, which first in the tubes became enclosed by a membrane, and thus assumed the form of ova. Regner de Graaf was very near the just solution of this question, that the Graafian vesicle contained the ovulum already formed, and enclosed in a membrane, though he rather concluded, than by immediate observation supported, this answer.

Valentin, in the next place, shows by quotations from de Graaf, that the latter supposed the ovulum to be at first very large, to lie close upon the inner membrane of the vesicle, and during the period between the moment of conception, and the escape of the ovulum from the ovary, to lose considerably in size. De Graaf seems, however, to have regarded the fluid content of the vesicle as the ovulum, having, doubtless, been misled by the appearance of a more solid substance taking the place of the fluid, at the periphery of the vesicle, before the formation of the corpora lutea. The followers of De Graaf retrograded rather than advanced in the question, and it was particularly the authority of Haller that induced them to give up the idea of an already formed ovulum being contained in the Graafian vesicle, and to suppose that the ovulum was formed out of the substance discharged from the vesicle. It seems, however, certain, that Cruickshank had the opportunity for observing the ovulum, at the moment when it was about to rupture the vesicle, and to pass into the tube, and indeed he distinctly expressed his conviction that the projecting part was the ovum itself. The researches of Prévost and Dumas not only confirmed the experience of De Graaf, regarding the minuteness of the ova after their entrance into the tubes and uterus, but these distinguished naturalists spoke distinctly enough for the existence of the formed ovulum in the Graafian vesicle, and they appear, indeed, to have twice seen it there. Their words are: "Very probably the vesiculæ or the ova of the ovary contain in their interior the minute ovula of the cornua, which are there surrounded by a fluid intended, perhaps, to facilitate their descent into the womb. Twice in opening vesiculæ very far advanced have we found in their interior a small spherical body, a millimetre in diameter. But it differed from the ovula which we observed in the cornua, in being much less transparent."

The next requisite was now to show the circumstances of the already seen ovulum, within the Graafian vesicle, in the impregnated state, and the next step towards this was taken by a German naturalist, Karl Ernst v. Baer.[*] He saw, namely, with the naked eye, in the Graafian vesicles of the dog, small white spots, which admitted of being displaced. When he examined these under the microscope, he found ovula similar in all respects to those found in the tubes. They had a diameter of from $\frac{1}{30}$th to $\frac{1}{20}$th, some, indeed, a diameter of only $\frac{1}{50}$th of a Paris line, (about $\frac{1}{32}$d, $\frac{1}{21}$st, and $\frac{1}{53}$d, respectively, of an English line,)—they were surrounded by a ring of granules, (*discus proligerus* of Baer,) or as if sunk or imbedded in a kind of depression in the granulous mass (*cumulus*). The examination of the Graafian vesicles of other Mammalia, as of the cow, swine, sheep, rabbit, and the like, and of Man, showed the same contained vesicle. That it was the ovulum of Mammalia was self-evident. But now there arose a new and equally important question. If, namely, the ovulum contained in the Graafian vesicle corresponds with the ovum of the bird in the ovary, how is it (the ovulum) related to the germinal vesicle of the Mammalia? V. Baer believed that the ovulum seen by him corresponded to the germinal vesicle of the rest of the animal world, and thus ascribed to it an ambiguous signification, for he regarded the ovulum, on the one hand, as the yolk, *i. e.* a persistent, on the other, as the germinal vesicle, *i. e.* a transient structure. The existence, indeed, of the ovulum of Mammalia within the ovary was thus placed beyond a doubt; but the analogy with the bird entirely failed, or was to be supplied by raisonnement alone. Seiler confirmed what V. Baer had seen, without adding any thing really new. Coste and Delpech, who have most recently written on the earliest developement of animals, allow themselves, indeed, through insufficient theorems, to be led into many errors, yet have the distinguished merit of having decidedly pronounced the perfect analogy between the ovulum of Mammalia, and the ovum of the bird. Although they have entirely false notions of the germinal vesicle, as we shall fully show further on, yet they maintain having discovered in the unimpregnated ovum of the rabbit, on the surface of the yolk, and in the thickness of the germinal membrane itself, a minute vesicle, of such tenuity and transparency that it very closely resembled a soap-bubble: and that this was the true germinal vesicle contained in the ovum of the rabbit. This remarkable result induced me anew to enter upon researches on the already known ovulum of the Graafian vesicle. I was so fortunate as to find the germinal vesicle in all of the Mammalia examined, and completely to inform myself regarding the relations of the same, as well to the ovulum, as to the Graafian vesicle, in this class of animals. My experience on this subject, together with the drawings belonging to it, are contained in Bernhardt's paper, *Symbolæ ad ovi Mammalium historiam ante prægnationem*.

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[*] *De ovi mammalium et hominis genesi*, *Lips.* 1827. 4. and Commentary to this paper in Heusinger's Zeitschrift, ii. p. 125—194.

Wratisl. 1834, 4to. A short sketch of such part of it as is applicable here may not be unsuitable, especially as I report according to my own, most unprejudiced experience alone.

In the ovary of each of the Mammalia, there is found a greater or less number of spherical pellucid vesicles, the so-called *folliculi Graafiani*, (Graafian vesicles,) the greater part of which are situated near the surface of the organ. Their size is very different, as well in different animals, as in the same ovary of the same animal, since the older ones are sometimes four to five times, as in rabbits, dogs, cats,—sometimes eight to ten times, as in man,—sometimes ten to twenty times, as in ruminating animals,—sometimes thirty to fifty times, and still more, as in the swine,—larger than those recently formed, and this, too, independently of their increase in volume after impregnation. When situated close to the surface, they are covered by the peritoneum alone, when deeper, by the latter, and by the fibrous tissue of the ovary, and closely invested by a net-work of vessels, between which there is a granular membrane. They are everywhere closed, without a trace of processes, but intimately united with the substance of the ovary, so that in general it is not so very easy to dissect the vesicle freely out on all sides, without laceration. The Graafian vesicle itself in each of the Mammalia consists of the following parts.

1. *The outer Membrane.*—It is very delicate and intimately united with the enclosing strata which belong to the ovary, so that it is through maceration alone, as was found by Von Baer also, that it can be separated to a considerable extent. On its internal surface, there is a layer of tolerably dense minute granules, which perhaps constitute a proper membrane; yet this is here still more difficult to determine than on the internal surface of the yolk-membrane of birds. There is not any perceptible difference in the thickness of the outer enclosing membrane in any part of the Graafian vesicle; for the apparently greater tenuity of that portion of the surface directed towards the cavity of the abdomen depends on the envelope of the ovary, not on the membrane itself of the vesicle. In the smaller vesicles, however, it is relatively much stronger than in the larger.

2. *The fluid content of the Graafian vesicle* is a mass containing a great number of minute granules: it is of a very fluid consistence, and appears grayish or very slightly yellowish white in colour. In the recent state it always exactly fills the cavity of the vesicle, so that the latter is tense throughout, and has a spherical form. The fluid resembles albumen, since it coagulates, as Von Baer observes, with heat or alcohol, becoming a white albuminous mass. This fluid is not similar throughout, the granules being in many parts, towards the periphery, more

densely collected together, so that, especially if the vesicle be gently pressed between two plates of glass, there are seen in it, more or less spread out, isolated spots. In the rabbit, and in part also in the cat and swine, these isolated spots are decidedly round, and lie in tolerably regular spaces, so that the whole acquires the appearance of shagreen, or, more highly magnified, looks somewhat like the merenchymatous cells of plants. The cause of this is the following: There are found, according to Von Baer, in all the Mammalia, in the content of the Graafian vesicle, drops of oil, which we ourselves have had an opportunity of seeing very distinctly in the cow, cat, and rabbit. In the latter, the number of these pellucid, perfectly transparent, structureless drops, is very considerable. But each of them is surrounded by many closely collected granules of the vesicle, so that, as these peripheral accumulations press together, one is somewhat reminded of the cellular tissue of plants. Each of such granulous accumulations appears, in the uninjured vesicle, as a dark, almost black isolated spot. In the older vesicles, the content of which is naturally more considerable, the quantity of the fluid has become relatively greater than that of the granules. The colour is more pellucid, rather than darker.

3. *The Disk.*—We give this name to a part of the Graafian vesicle, which V. Baer, who considers the ovulum analogous to the germinal vesicle of birds, calls *discus proligerus* and *cumulus.* It is more or less circular, and surrounds the ovulum. Its size is pretty nearly in proportion to that of the ovulum, which rests upon or in its centre. Its substance consists of a multitude of closely collected granules, which are more or less transparent, and impart to the whole a grayish-white or yellowish-gray appearance. The disk varies in thickness and opacity. In the cat and dog it is so considerable, that it can be seen as a grayish-white spot in the vesicle within the ovary. This is also possible to a keen eye in the rabbit, but neither in ruminating animals, in the swine, nor in man, where the disk is to be perceived under the magnifying glass alone. Whether it be continuous and connected in a membranous form, with any part of the Graafian vesicle, does not admit with certainty of being determined, since, on the one hand, the parietes of the vesicle are too thick and opaque, and, on the other, after the opening of the same, the disk flows freely in the fluid without connection with any part except the ovulum. In the rabbit alone it appears distinctly, that the disk is surrounded by the above-described isolated spots, and even after removal of it out of the vesicle, there often remains around the disk, a ring of greater or less breadth, which consists of transparent globules, surrounded by masses of granules. It appears then, that, as seen out of the

Graafian vesicle and under the microscope, the disk is a lacerated, and, through handling, an injured structure. The granulous content of the vesicle probably lies more or less closely on the internal surface of its membrane, and is thickened only at the circumference of the ovulum to form the disk. Hence the latter never has a well-marked, round, external periphery, as would necessarily be the case, were it an independent isolated portion of the Graafian vesicle.

4. *The most important part of the Graafian vesicle is the ovulum.*—It lies as a perfectly spherical minute body, more or less deeply sunk in the centre of the disk, close under the proper membrane of the vesicle. That portion of its surface directed outwards generally touches the internal surface of the membrane of the vesicle, yet without being organically connected with it. Below its under surface is the disk, while its circumference seems freer, since the depression which the disk forms for the ovulum is greater than the latter itself, and hence there arises a circular space between it and the plain-like outspreading of the disk, which space is probably filled with a transparent fluid. There is nowhere seen a trace of any process, by which the ovulum is made fast or suspended to any part. It lies loose only, on the internal surface of the membrane of the vesicle, while it is more intimately connected with the disk, probably through the viscid pellucid fluid that occupies the space between them; for I have never been able to perceive the ovulum, without more or less distinct traces of the disk: only the latter is narrower, more delicate and transparent, the more recently formed the Graafian vesicle. It is remarkable, that the ovulum throughout does not keep pace with the Graafian vesicle in its growth. In small Graafian vesicles, it is, like the germinal vesicle in the egg of the bird, relatively very large; while in the older ones, though absolutely larger, it is relatively much less. The above-mentioned paper is accompanied by the micrometric results quoted further on. We shall, besides, return to this subject.

In order to become acquainted with the more precise structure of the ovulum, one must as much as possible separate the latter with the disk, from the remaining content of the Graafian vesicle, and gently squeeze them together between two glass plates under the compressor. But this proceeding requires above all things, patience, tranquillity, and some manual expertness, for the ovulum itself very easily bursts, and still more easily, the very delicate germinal vesicle contained in it. To find the germinal vesicle in the ovum of the Mammalia many vain attempts were made, as well by Purkinje as by myself, but they were unsuccessful, because undertaken in ova of ruminating animals and swine, in which this vesicle is extremely delicate, and to be recognised only when the observer has already seen it in other Mammalia. Very lately, when, incited by Coste's assertions, I again entered this field of inquiry, I discovered it first in the ovulum of the cat, where it is strong and tolerably firm. I therefore recommend those who wish to convince themselves of the existence of this important structure in the Mammalia to examine first the cat. Since that time, it has almost never failed me, to exhibit the germinal vesicle in the ova of all the Mammalia which I have examined, for example of the dog, rabbit, squirrel, sheep, cow, mole, rat, and the like. I can here quote the authority of Purkinje also, who has likewise seen it in all the animals now mentioned. It is thus a fact which experience has firmly established, that the ovulum of the Mammalia also, contained in the Graafian vesicle, has its germinal vesicle, which is present there under the same circumstances entirely, as the germinal vesicle in the ova of other animals, in particular of birds. See the representation of the same in Bernhardt's dissertion quoted above. Tab. I. Fig. I. IV. VII. X. XVI. XIX.

In man alone, from outward circumstances, the germinal vesicle is very seldom to be perceived. As, usually, human subjects have lain a day, or longer, before they are taken up for examination, the first commencement of decomposition and maceration has already taken place, during this time, within the Graafian vesicle. This is easily recognizable in the ovulum also. Its content is usually clouded, without regular arrangement; no longer can a trace of the germinal vesicle be perceived, and the external periphery itself of the ovulum appears double, whilst, besides the circle surrounding the granulous content, there is visible yet another very delicate circle around the first. We must therefore candidly confess, that in very many examinations, we have only twice succeeded in observing, with all decision, the germinal vesicle of man.

In the ovulum itself of the Mammalia, there are to be distinguished the following parts.

1*stly*, *An outer membrane.*

2*dly*, *A granulous layer*, *internal to the same.*

3*dly*, *A perfectly transparent*, *half-fluid*, *content.*

4*thly*, *The germinal vesicle.*

We shall now go through the most important of what is to be remarked concerning these parts, in the order in which they have been named.

1*st*, *The Membrane of the Ovulum.*—It is always single, never shows in the recent state a trace of separation into several laminæ, has no granules, and presents no fibres of any kind. Its transparency appears to be somewhat lessened by a tinge of yellow. Its thickness is always found in all parts the same.

In the squirrel, for example, it amounted throughout to 0,000455 (Paris inch?) Through pressure of the ovulum between two plates of glass, this membrane is visible as a ring of greater or less breadth surrounding the ovum. If the pressure be continued further, the membrane bursts, and the content immediately flows out. In the Rodentia this always happens later than in the Ruminantia, in the swine, and in man. But if it have taken place, the transparent membrane is to be recognised only through the circle of shadow it casts, or in diminished light.

2. *Under the outer membrane of the ovulum, there is found a layer of decidedly spherical, very minute granules*, which, excepting in the region of the germinal vesicle, completely surrounds the content. In the periphery of the germinal vesicle, the granules are for the most part sparingly distributed, or altogether fail. But they are never found at the part where the germinal vesicle is applied to the internal surface of the membrane of the ovulum. Only in extremely rare cases have I seen the granules of equal size. This was met with most, proportionally, in the rabbit, squirrel, swine, and man. But even in the latter, they are often enough seen, in the same ovulum, sometimes so minute, that they can scarcely be distinguished from the molecules of Brown, sometimes ten times and more larger than the latter. Thus, for example, the largest granules in the ovulum of the cat had a diameter of 0,000202 Paris inch, (=0,000215 English inch.) Smaller ones, on the other hand, a diameter of 0,000076 Paris inch, (=0,000081 English inch,) while the smallest were of a size not to be measured. But another important question is, whether this granulous layer forms a peculiar membrane or not? The minuteness of the object, and the great delicacy throughout of its component parts, are such, that an answer must here be cautiously given. We have never indeed succeeded in exhibiting portions of such a granulous membrane. The decided manner, however, in which the granules always lie close to the periphery, while they are never found in the inner fluid content, and the more or less definite limits which they find in the region where the germinal vesicle is attached, warrant the conclusion, that the granules are held together by a firmer substance than the fluid content, soon to be described, and that thus there is formed a very soft and delicate membrane. But when Coste finds, on the one hand, what we have just stated, on the other, a resemblance to the more perfect yolk-globules of the bird, the analogy can relate to the circular form, and perfect transparency alone: in all other properties they differ.

3. *In the centre of the ovulum*, and, therefore, for the most part, inclosed in the above considered granulous layer, *there lies*

a perfectly transparent, pellucid, half-fluid and viscid matter, which, after laceration of the membrane of the ovulum, flows out in part more slowly than the layer of granules. It appears through maceration to lose some of its viscidity, and, besides, easily to acquire a more fluid form.

4. *The Germinal Vesicle* always lies close under the membrane of the ovulum, and is generally in part embraced by the layer of granules. Of its existence there can no longer be any doubt, as I have, sometimes alone, sometimes in company with Purkinje, Bernhardt, and others, observed it more than sixty times in the ovula of the most widely different Mammalia; indeed, with the exception of some of those of ruminating animals, I have hitherto sought it in no ovula in vain. But to discover it is not so very easy. That it can be made visible only through compression of the ovulum, we have above stated. One must learn, however, to observe the due degree of pressure, for if it be too weak, nothing is seen, at least not in a decided manner, the vesicle; but if it be too strong, the extremely delicate germinal vesicle bursts, even before the continuity of the outer membrane of the ovulum is destroyed, just so as in the smaller ova of birds, the germinal vesicle usually bursts before the laceration of the membrane of the yolk. Extremely seldom only, in the ovulum of the Mammalia, does the contrary happen, that the germinal vesicle comes free, and uninjured, out of the lacerated ovulum. I have hitherto had the opportunity for seeing this only three times, and have given a drawing of the appearance of the vesicle, under such circumstances, in the above-mentioned dissertation of Bernhardt. I recommend those to whom it is possible to use, besides, an aplanatic apparatus. If this be provided, the germinal vesicle, with some dexterity and practice in examinations of the kind, can scarcely escape notice. It is, just as in the egg of the bird, a transparent vesicle of a spherical or slightly oval form, and consists of a perfectly transparent, homogeneous membrane, and a not less transparent throughout colourless, and non-granulous content, which indeed is itself of more viscid consistence than the diaphanous fluid contained in the centre of the ovulum, though the viscidity of the former does not continue so long as that of the latter. If one succeeds, as in rare cases, in isolating the germinal vesicle out of the cavity of the ovulum, one may by further pressing, burst it, and thus here also separate from one another, its covering and content. The relative size of the germinal vesicle seems always to continue nearly the same. The absolute, on the contrary, adapts itself to the absolute size of the ovulum. Thus in the rabbit, where the ovula are relatively smaller than in beasts of prey, I found the germinal vesicle correspondingly smaller.

Concerning the relations in size of the parts of the Graafian vesicle and of the ovulum in the Mammalia and in man, I have selected the following measurements, taken with a screw-micrometer, in order to arrive at certain results on this important subject.

Tabular view of the Micrometric Observations made by myself on the parts of the Graafian Vesicle, and of the Ovulum, in different Mammalia and in Man.

(The measurements were determined according to Paris inches. They have been reduced by the translator to English inches.)

		Diameter of			
		Graafian Vesicle.	*Ovulum.*	*Germinal Vesicle.*	*Miscellaneous Parts.*
I. *Vespertilio murinus*, .	1.	0,014560	0,003764		
	2.	0,016178	0,007549	0,001940	
II. Dog, .	1.	0,057485	0,004314		
	2.	0,006471	0,003450		
	3.	0,007549	0,003666		
Diameter of the pellucid fluid surrounding ovulum No. 1, and separating it from the disk, .					0,008628
III. Squirrel,	1.	0,025884	0,003559	0,001207	
	2.	0,026963	0,003774		
	3.	0,004314	0,002157		
	4.	0,008089	0,002696		
Diameter (?) of the membrane of the ovulum in No. 1,					0,000479
IV. Mole, .	1.	0,004961	0,003148		
	2.	0,006471	0,003472		
	3.	0,006578	0,003559		
	4.	0,006901	0,003882		
	5.	0,007549	0,003666		
	6.	0,010246	0,003774		
	7.	0,012081	0,004097		
	8.	0,021570	0,004205		
	9,	0,012942	0,005392		
	10.	0,023926	0,005392		
	11.		0,004955	0,001078	
	12.		0,005392	0,001671	
V. Rabbit, .	1.	0,004314	0,001204		
	2.	0,004961	0,001342		
	3.	0,005715	0,001239		
	4.	0,005823	0,001293		
	5.	0,005931	0,001401		
	6.	0,006039	0,001563		
	7.	0,006254	0,001725		
	8.	0,007010	0,001833		
	9.	0,007549	0,002048		
	10.	0,007765	0,001939		
VI. Swine, .	1.		0,005392	0,003559	

	Diameter of			
	Graafian Vesicle.	*Ovulum.*	*Germinal Vesicle.*	*Miscellaneous Parts.*
VII. Cow, . 1.		0,005176	0,002264	
VIII. Sheep, 1.		0,006686	0,004204	
IX. Cat, . from		0,005176 to 0,004636	0,001619 to 0,001509	
Semidiameter of the disk surrounding the ovulum. Mean,				0,004205
Diameter of the globules contained in this disk,				0,000215 to 0,000080
X. Man, 1.		0,003126	0,001939	
2.		0,003343	0,002048	
Diameter of the disk surrounding ovulum No. 1,				0,005931

From these measurements, the following results are determined:

1. It is obvious that the absolute size of the Graafian vesicle is subject to much greater variation than that of the ovulum.

2. The ovulum is, in relation to the Graafian vesicle, so much the larger, the more recently formed and smaller the latter.

3. The germinal vesicle does not follow in the Mammalia and in man, the same relations in size as in the bird, where in this respect, it is proportioned to the yolk-ball, just as the ovulum of the Mammalia is to its Graafian vesicle. It appears rather, as we shall in the parts of the embryo have frequent opportunities for seeing, to be laid down of a certain determined size, and upon the whole, to vary little according to its conditions in regard to age.

4. The size of the globules contained in the ovulum of the Mammalia differs much from that of the yolk-globules of the bird, but approaches more or less that of the minute particles found between the latter.

For several other more special relations in the above measurements, Von Bernhardt's dissertation already mentioned.*

Having now without any subordinate remark, without any tendency towards analogy, described the simple facts seen or discovered by others and by ourselves, we undertake, in the next place, to determine the signification of the parts named. This would admit of being stated with decision, did we possess a sufficient and complete analysis of the ovulum, that is found, soon after its exit from the ovary, in the beginning of the tubes. But so long as this is wanting, there must necessarily remain many gaps to be mentioned soon. Yet an accurate knowledge of the ovulum and of its parts, as contained in the Graafian vesicle, may enable us to arrive at no small degree of certainty on this subject.

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* *Cap. vi. p.* 30–32.

K. E. v. Baer became embarrassed, as we may without arrogance maintain, because he was not acquainted with the germinal vesicle contained in the ovulum of the Mammalia, and therefore identified the former with the ovulum itself, and regarded the disk surrounding the ovulum, and contained in the Graafian vesicle, as the foundation of the embryo. It is but too obvious, however, from his work, how incapable he was of extricating himself, for although he gives several acceptations as possible, yet he is not able to carry through any one of them with decision, and is therefore not in a condition satisfactorily to answer the cardinal question, whether the ovulum of the Mammalia be, or be not, analogous to the ovum of the bird before impregnation. If we now attempt, according to our more perfect experience, to give information on this point, it may be most to the purpose, to pursue as carefully as possible the comparison between both classes of animals.

The advanced ovum of the bird agrees in a few points only with the advanced ovum of the Mammalia ; but, on the contrary, differs in most respects from it.

1. The external enclosing membrane, or the membrane of the yolk, is in both destitute of any perceptible internal structure, at the most, in the bird, endowed with a few complicated irregularly situated fibres, which are not easily seen. In no part is it through a particular process, &c. organically united to the neighbouring parts, but forms a perfectly closed and circumscribed sphere.

2. The greatest portion of the unimpregnated ovum or the yolk of the bird, consists of three different parts:

a. Of large oil-like, yellow, or yellowish yolk-globules.

b. Of very minute globules, distributed between the yolk-globules ; and

c. Of a transparent pellucid fluid, in which are found as well the globules of the yolk as the smaller globules.

Analogous to these parts, present in the ovum of the bird, grown, and ready to make its exit, there are found in the ovulum of the Mammalia and of man, the following:

a. The pellucid transparent fluid, which here seems to have a more oily consistence.

b. Particles, some of which are of equal size with the smaller particles of the yolk of birds, some rather larger.

On the other hand, there is here no trace of larger oily yolk globules.

3. In the central cavity of the yolk of the bird, there is found a peculiar half-fluid mass. There is present also an oil-like, perfectly transparent fluid, in the centre of the ovulum of the Mammalia. Only the central cavity in the latter is not nearly

so decidedly limited, indeed it does not generally appear to be certainly circumscribed, and separated from the granulous mass.

4. The germinal vesicle is found in the ovum of birds, as well as in that of the Mammalia, as a pellucid, diaphanous, extremely delicate vesicle, which consists of a structureless outer membrane, and of a uniform non-granulous fluid content. In birds, however, it is sunk into the disk, just as the ovulum of the Mammalia is sunk into the disk of the Graafian vesicle. In the latter, on the other hand, there is in the whole, a small part covered by the granulous content. Also the germinal vesicle of birds is much smaller in relation to the yolk, than the germinal vesicle of the Mammalia in relation to its ovulum.

Add to this, that the ovum of birds is enclosed by the coverings and substance of the ovary alone, while the ovulum of the Mammalia lies imbedded in the Graafian vesicle, and indeed in the disk of the latter.

From all this we can draw with decision the conclusion, that the ovulum of the Mammalia is entirely unlike the advanced ovum of birds. But a comparison of the advanced ovum of the Mammalia, with the early or primitive condition of the ovum of birds, leads to a sentiment almost directly the reverse. As we have in part, already seen above, the ovum of birds in the first stage of developement is of a grayish white colour, and consists of a perfectly transparent fibreless yolk-bag, of minute globules, without a trace of the true larger yolk-globules, and of a perfectly transparent fluid mass, collected especially in the centre, which at the same time unites together the single particles contained in the ovum. The germinal vesicle is in relation to the ovulum, much larger than at a later period, while every trace of an imbedding of the same in the disk, as well as of the disk itself, entirely fails. Does not this description suit also, word for word, the ovum of the Mammalia? The resemblance here is most entire, and we therefore assume, confirmed as it is by certain observations, the following position.

The ovum of the Mammalia resembles perfectly the unadvanced ovum of birds, but essentially differs from it, so soon as the true yolk-globules have appeared in the latter.

It is self-evident, however, that we do not here speak of perfect identity, since the difference in the individualities of the Mammalia and of birds, renders such a thing impossible. Thus, for example, the particles contained in the ovulum of the Mammalia vary much more than those contained in the earliest forms of the ovum of birds. But there can be no doubt that nature has followed the above pointed out original idea in the structure of both forms of ova.

If it be thus shown that the ovulum of the Mammalia is, as it were, an unadvanced, (or found in the earliest stage of developement) ovum of the bird, this stands in perfect accordance with the whole evolution of the Mammalia. We shall afterwards see that, and why, the yolk of birds performs so important, that of the Mammalia a more subordinate, part. The immense difference in the perfection of the same organs, in the two different classes of animals, finds through our representation, a first, certain, morphological foundation; since we have pointed out, that the ovulum of the Mammalia remains standing upon a step in its progress, which the yolk of birds, at a pretty early period, passes over, and leaves behind.

On the other hand, there is found in the Mammalia, and in man, a peculiar formation, occurring in no other class of animals, viz. that the true ovulum is enclosed in another oval body, the Graafian vesicle. The function of the latter is indeed obscure, yet perhaps the intention of it may therein be sought, that in the Mammalia the idea of internal developement is so far extended, that the ovulum itself in the ovary is particularly enclosed, and preserved in a structure belonging to the mother. For, according to what we shall bring forward regarding the formation of the corpora lutea, it is scarcely to be expected, that the Graafian vesicle and its contents have a very important influence after conception, and the exit of the ovulum from the ovary. As little can the disk, in which the ovulum is imbedded, exercise an important function in the after time. Compare below, on the formation of the *corpora lutea*,

II. *The ovum from the moment of its separation from the ovary, to the period when it becomes fixed in the uterus for the developement of the fruit.*

The history of the egg of the bird must here also serve as a basis to which we may refer what has been discovered in the Mammalia. We follow on this subject also, the observations of Purkinje, who has most completely investigated this series of phenomena. When the ovum of the ovary has acquired a certain size, but still consists of the yolk-bag, the yolk, the disk, and the germinal vesicle, it begins to loosen itself from the ovary, in order to enter the oviduct. In this, however, there is shown a double change: 1*stly*, The membrane which belongs to the ovary, covered on its internal surface with blood-vessels, and forming the outer covering of the ovum while in the ovary, is lacerated at a certain spot, to admit of the free exit of the ovum. This spot is characterized, even in smaller ova, by a changed appearance. It becomes thinner and finer, and so by degrees soon disappears. But the opposite part of the ovum has, in the meantime, become considerably elongated, so that the ovum about to make its exit, mostly hangs down from the ovary. *2dly*, The germinal vesicle becomes invisible. It probably bursts, and pours its fluid first of all into the disk. It is not, therefore, without reason that it has been regarded as analogous to the semen,—as a sort of female semen. The disk, which earlier, at the part where the germinal vesicle lay, shewed a transparent point, has now, at this spot, a white kernel. Prepared in this manner, the ovum passes into the oviduct, whilst the vascular covering belonging to the ovary remains seated in this organ. The ovum is carried along through the contractions of the oviduct, which at this time has a true, perfectly formed, muscular structure, and receives, during its progress, new enclosing formations, as the albumen, the chalazæ, the membrane of the shell, and the shell itself. It first passes into the commencement of the oviduct, which is marked by longitudinal folds of the mucous membrane. Here a secreted and very delicate layer of albumen surrounds and perfectly covers it, but above and below, *i. e.* at those parts where the distension caused by the ovum ceases, forms a very soft knot, from which there proceeds a string, that is closely encompased by the folds of the mucous membrane of the oviduct. The progress of the ovum continued through the peristaltic motion of the oviduct, takes place now in a spiral course, and hence the albumen also, which is always secreted immediately at the part where the ovum lies, assumes the spiral form. Of this, one may immediately convince himself, by taking an ovum from this part of the oviduct, and laying it in cold water, where the indurated albumen appears in the form of spiral blades, and admits of being stripped off. The threads at both ends of the ovum are likewise turned spirally round on their axis, and thus form the twisted organs of the perfect ovum, called chalazæ. The latter present densely twisted threads, which arise in the following manner: The first layer of albumen that is formed around the ovum, as soon as it has entered the oviduct, becomes indurated, and assumes a membranous form. This membrane, which immediately surrounds the yolk-bag, and was minutely studied by Dutrochet in particular, becomes more and more dense, more like the yolk-bag, and thus forms a continuation of the cords of the chalazæ. This representation of the origin of the chalazæ has been in all respects confirmed through his own observations, by Berthold.* When the ovum has now reached a certain part of the oviduct, to which the name of Isthmus has been applied, the mucous membrane of which, also, certainly differs from that of the preceding part of the oviduct, and is also marked on the internal surface with a circular boundary line, it is surrounded by a thick homogeneous layer of albumen, and furnished at both ends with the chalazæ. In the isthmus, *i. e.* in that division of the oviduct, from the marked spot mentioned, to the beginning of the uterus, so called, the membrane of the egg-shell is formed around the ovum. As the isthmus is a straitened part of the oviduct, it becomes, as soon as the ovum has entered it, so distended by the latter, that all folds of the mucous membrane disappear. This contributes probably, at least in part, to the secretion here, of a thin, but membranous layer, the membrane of the shell. The latter is found only so far on the ovum, as it has penetrated into the isthmus, which always happens with the pointed extremity first. Purkinje, who sacrificed more than thirty hens to his earlier researches, never found an ovum completely in the isthmus, but only in part in the latter, in part passed out of it. Very recently, we were both so fortunate as to find an ovum just in the isthmus, and thence to inform ourselves of the manner in which the membrane of the shell originates. In the upper part of the isthmus, namely, there arises the fibrous layer of the membrane of the shell, which nature as it were, spins at once. There are found isolated threads, each of which is probably the secretion of a mucous follicle of the isthmus, which threads are the more frequent, and the more intimately united, the deeper the part of the isthmus in which they lie. At the lower part, on the other hand, there is found in addition to this fibrous layer, a layer of granules, which occurs as a proper secretion. Besides this, there probably arises in the isthmus, the space filled with air found in the egg, and, indeed at a place where, immediately under the stricture of the isthmus, the folds of the mucous membrane are interrupted. From the isthmus, the ovum passes into the upper part of the uterus, where the shell originates, in the first place, through polygonal calcareous deposits, which continue to increase until they form a dense covering.—According to this representation, which rests entirely and solely upon observations, the ovum is taken up by the mouth of the tube. The first fourth of the oviduct secretes the *membrana Dutrochetii*, and the first rudiments of the chalazæ,—the remaining part as far as the isthmus, the albumen,—the upper part of the isthmus, the fibrous,—the lower, the granulous layer, of the membrane of the shell,—the greatest part of the uterus, finally, the egg-shell,—while the vagina is destined to perform the expulsion of the egg. The bird's egg brought forth in this manner consists, when it is fresh and normal, of the following parts

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* *Isis*, 1829, p. 408.

1. Of the shell.
2. Of the membrane of the shell.

3. Of the albumen—three divisions of which have been distinguished,

a. A thin fluid portion immediately under the membrane of the shell.

b. A thicker, more viscid portion, between the thinner portion and the surface of the yolk.

c. A still denser portion in the neighbourhood of, and around the chalazæ.

With regard to the latter, it can scarcely be considered as peculiar. The first, on the other hand, does not arise until after the formation of the shell, and originates through the outer portion of the formerly equally viscid albumen assuming a more fluid condition.

4. Of the chalazæ.

5. Of the yolk-bag.

6. Of the yolk.

7. Of the mass contained in the centre of the yolk; and

8. Of the disk, germinal spot, germinal membrane at the commencement of incubation, or, according to the older appellation, cock's tread. This consists, however, as is afterwards distinctly shown, of two granulous layers, of the upper the true germinal membrane, and of another, which remains on the yolk, seems to be of subordinate importance, and is probably soon absorbed.

In now passing over to that period in the existence of the ovum of the Mammalia which corresponds wholly, or in part to that just treated of in the ovum of the bird, we think it proper, since conclusions at present can be drawn from isolated, and for the most part, incomplete experience alone, first of all, historically to quote the observations hereto appertaining, according as they occurred, and then, first, to point out the inferences, as well as the analogies with other animals, especially with birds. To this department belong the labours of those naturalists who wished to become acquainted with the first consequences of conception, and with the impregnated ova in the early conditions in which they had been met with either in their exit from the ovary, in their passage through the tubes, or indeed after they had passed into the uterus, without, however, having become fixed in, and in close contact with the internal surface of, the latter. The authors to be here reckoned are the following:

1. *Regner de Graaf* performed a series of experiments on the first effects of conception, which have been reached by few, and exceeded, it may well be said, by none of his successors. The results of his observations are briefly the following:*

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* The tabular form has been introduced here, as well as further on, by the *translator*, as well for the sake of brevity as to present *at a glance* such changes as were of contemporaneous occurrence.

Time after coition	*Ovaries.*	*Tubes.*	*Horns of the Uterus.*
½ an hour.	No change in the Graafian vesicles, at the most, a little loss of transparency.		Presented no trace of semen, but were somewhat more reddened than in the unimpregnated state.
6 hours.	Graafian vesicles redder, and contained a viscid transparent fluid.		No trace of semen.
24 hours.	In one ovary there were 8, in the other 5 Graafian vesicles opaque, and tinged slightly red. At their surface there projected a kind of minute wart. When cut open, they presented a small quantity of transparent fluid, and at the periphery, a thick reddish mass.		
27 hours.	Similar wart-like projections as in the last, on the surface of the Graafian vesicles. On pressure, the latter discharged first a transparent, then a reddish dense fluid.	Each fimbriated extremity embraced the ovary.	Contained no ova, but were very full of blood, and their mucous membrane was loosened.
48 hours.	The wart-like projections more considerable. On pressure, some albuminous fluid was discharged through them; but the remaining reddish substance of the Graafian vesicles had become thicker, and was therefore less easily discharged.		
52 hours.	In the Graafian vesicles a glandular mass, the centre of which contained a cavity without fluid. No ovula found.	No ovula found. (Doubtless overlooked.)	
72 hours.	The wart-like projections had a minute aperture in the centre, and contained in their interior an empty cavity.	The fimbriated extremities very closely embraced the ovaries. Ovula out of the Graafian vesicles now found; extremely small, and consisting of two membranes, the one enclosed in the other, on laceration of which, there passed out an extremely transparent fluid.	
4 days.		The ovula had advanced further, and each contained more distinctly a vesicle inclosed in it.	
5 days.		The inner vesicular membrane still more recognizable.	

In six to seven days the ovula had considerably increased in size; De Graaf, however, was not in a condition to recognize in them an embryo. He failed to do this also, as, later, Prévost and Dumas, and Von Baer have likewise done, in ova of the eighth day, because the latter are then, on the one hand, already firmly fixed on the internal surface of the uterus, on the other hand, so extremely delicate, that, with the slightest injury, they are lacerated. In some ova of the ninth day the embryo presented itself to De Graaf as a faint cloudiness, whereas he distinctly saw it already forward in its developement in ova of the tenth day. Had Regner de Graaf made use of the microscope in these examinations, science would, more than a century and half ago, have been enriched with results, which unfortunately in the present day, we discover to be still wanting.

2. Valentin then shows that the enquiries of *those who succeeded de Graaf* were not characterized by equal circumspection, pains, and fundamental research, and that the authority of Vallisneri, Kuhlemann, Haller, and others, suppressed the truth, that the ovulum itself was contained in the Graafian vesicle, and substituted for it the erroneous assertion that a fluid merely, without a covering, was poured out of the ovary into the tubes, or that, as Osiander even in the beginning of the nineteenth century maintained, the ovaries were not at all concerned in conception. Cruickshank, however, has the merit of having repeated and confirmed the experiments of De Graaf, but he added nothing really new, and through some errors, even darkened the subject.

3. *Prévost and Dumas* have more recently given a series of laborious and minute experiments on the first effects of conception in rabbits and dogs.* The following is from their observations:

Time after coition.	*Ovaries.*	*Tubes.*	*Horns of the uterus.*
4 hours.	No change either in dogs or in rabbits.	Lively motions of the animalcules of the semen.	
2 days.	Ditto, except that the Graafian vesicles had increased in size, and the central point of their surface had become more transparent.	Do.	
3 to 4 days.	Graafian vesicles still larger, sometimes from 7–8 millimêtres in diameter, in dogs.		
After 6 to 7 days.	The Graafian vesicles opened, so that an aperture was seen in their surface.		

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* *Annales des Sciences Naturelles, Vol. iii. p.* 113–133.

Time after coition.	*Ovaries.*	*Tubes.*	*Horns of the uterus.*
8 days.	In one case, the Graafian vesicle found at the moment of bursting, and	ovula found in the tubes of 1½–2 millimêtres in diameter, of an elipsoidal form, and consisting of a single and transparent membrane & a pellucid fluid. At the upper part of the ovulum a flaky shield, much thicker, and furnished with very many minute wart-like elevations, having at one of its extremities an opaque, white, round spot like a cicatrix.	
After 12 days.			The ovula are still smaller than the Graafian vesicles of the ovary, and, indeed, the smaller, the nearer they lie to the ovary. The embryo very distinctly perceived.
Later.			In more advanced ova, their two extremities are prolonged, horn-like, in the axis of the horns of the uterus: rarely such a horn-like prolongation issuing towards one side only. The ovum is throughout smooth, except in that part at which the fœtus is found.

Though in dogs the ovula do not pass into the tubes until the eighth day, this happens in rabbits on the third; and the ova of rabbits of eight days, are in that stage of advancement, in which ova of at least thirteen days are found in dogs.

4. *Karl Ernst von Baer* has made a series of observations in connection with this subject, especially in dogs. He thus often had the opportunity of observing an ovulum of half a line in diameter. Such ovula were perfectly diaphanous, and lay quite free, in the cavity of the uterus. Examined with the microscope, they were found to be, not entirely spherical, but of a somewhat elongated form. At first they appeared to have but a single membrane, but in less than a minute, the inner membrane separated itself at both extremities from the outer, so that there arose between both, a curved empty space. This separation proceeded to a certain point, at which the two membranes remained united. By degrees, the inner, and afterwards the outer membrane also, of the ovulum, collapsed. The outer membrane is semitranspa-

rent, furnished with minute warty elevations, and appears to consist of two lamellæ. On the inner membrane, there is found a multitude of minute circular rings, which are diaphanous in their centre. These rings consist, as shown when they are more highly magnified, of many granules arranged in a circle, and not touching one another. There is shown, besides, a much larger, opaque, round spot, the germinal membrane, *blastoderma*, which can be seen already, as a white point, by the naked eye,—stands off somewhat from the inner membrane of the ovum,—and is surrounded by an extremely delicate space. (Hof.) Other ova of the dog, of $\frac{1}{3}$d of a line in diameter, were less diaphanous, and more spherical, than those just described. They likewise had two membranes, but on the outer one, the wart-like elevations were scarcely recognizable, whereas, the inner membrane presented minute spots, consisting of accumulations of granules. The germinal membrane was thicker than in the last case, and not, like it, even, but presented inequalities. At the mouth of the tube there was found, free, in the same uterus, a very minute white granule, which presented, under the microscope, an opaque kernel, with a pellucid ring. Was this an ovulum just passed out of the tube? V. Baer on that account examined the ovula of the tubes in the dog. They were somewhat smaller than this little body, and appeared like minute, yellowish-white points of $\frac{1}{15}$th of a line in diameter. In the centre, there was here found an opaque kernel, which itself consisted of many granules, and had a granulated surface. This kernel was surrounded by a narrow diaphanous space, and by a periphery furnished with granules, the membrane of which was scarcely visible.

5. *Coste*[*] has most recently imparted something concerning his observations. According to him, the ova of the rabbit have already made their way into the oviduct two days after impregnation, and then appear perfectly similar to the vesicles enclosed in the folliculi Graafiani, (Graafian vesicles.) After four days they are in the horns of the uterus, free, however, and moveable, and one line in diameter. The germinal vesicle and the membrane of the yolk are still to be recognised, while the yolk is absorbed in proportion to the growth of the germinal vesicle. After five days, the ova are fixed in the uterus, and two lines in diameter. Their germinal membrane has now grown more than its contained germinal vesicle, which occupies only about a third part of the same, is appended in it at one point of the place of attachment of the ovum in the uterus, and here presents a cloud-like obscure, round, or elliptical spot.

Finally, we must mention the *cases in which human ovula*

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[*] *Froriep's Notizen, Novemb.* 1833 *No.* 830, *Pp.* 241—244.

are maintained to have been found in the tubes. It is said that an observation of this sort was made so long since as by John Burns. (The Anatomy of the Gravid Uterus, 1799.) Most recently Seiler, (Die Gebärmutter und das Ei des Menschen, 1832,) has described a case in which there was found, in the fimbriated extremity of the Fallopian tube, a flaky body, filled with a yellowish-white fluid, and furnished on its surface with a granule of a line in length, which body the author, though with very slender grounds, considers an ovulum. The same is to be said of another case, supposed to have been one of incipient graviditas tubaria.

In now undertaking to indicate the *continuous progress of the first appearances in their order, which present themselves after impregnation in the Mammalia*, we must not omit to call attention to the fact, that, notwithstanding the manifold endeavours above-mentioned, the subject is not only not exhausted, but still remains exceedingly defective and dark,—that the reports contradict each other in many essential points,—and that the microscopic examination of the delicate ovula is still incomplete. As in the ovum of birds, so in the ovulum of the Mammalia, we have yolk-bag, yolk, germinal vesicle, and perhaps at a later period, blastoderma also. All these parts constitute the ovulum contained in the Graafian vesicle, which ovulum, in consequence of conception, passes into the tubes. Immediately after impregnation, the flow of blood to the ovaries increases; the Graafian vesicles swell considerably, whilst, at the same time, the vascular covering of the latter, united with the external couch of the germen, becomes, by exuberant growth, a reddish dense mass. The ovulum advances more and more towards the surface; that part in the cavity of the Graafian vesicle on which it lies, seems to become attenuated, or in part absorbed, and thus, after the ovary has become embraced by the incipiently turgid tubes, the ovulum passes into the latter. According to Coste, the germinal vesicle does not here burst, but is persistent, and, indeed, enlarges by further growth. We must, however, doubt the correctness of this assertion. For, first of all, as, from our researches, we can decidedly maintain, the analogy of all other animals, avertebrate as well as fishes, amphibious animals, and birds,—in which the germinal vesicle bursts before the developement of the embryo,—declares the contrary. Also, it certainly would not in that case have escaped the notice of V. Baer and others, if it first considerably increased in volume, with enlargement of the ovum. At the same time, as we shall see further on, Coste manifestly still retains the idea conveyed by Rolando, that the embryo of the fowl is developed upon a vesicle; an assertion, the erroneousness of which is self-evident. According to analogy with the bird and the other vertebrated animals, albumen and the membrane of the shell should now form around the ovum before it is fixed in the uterus. The albumen, which is not wanting in the Mammalia, very probably originates during the passage through the tubes. The enormous swelling of the ova, in their passage through the Fallopian tubes, is in part favourable to this. But an indication of chalazæ might perhaps be found in the lateral elongations, discovered by Prévost and Dumas, in very delicate ova of the dog. In the same way it may be presumed, that the membrane of the shell, or the chorion, originates in the tubes, entirely as the shell-membrane of the bird is formed first in the isthmus. Von Baer, indeed, supposes that the outer membrane of the ovulum, contained in the Graafian vesicle, becomes the chorion. But, on the one hand, all analogy is opposed to this, since, besides that, in such case, as he also maintains, the yolk-bag must be formed first in the tubes; on the other hand, it was not until after maceration that he himself distinctly perceived another, outer membrane,—an appearance which is always repeated in the eggs of fowls which have not yet a shell-membrane. It would be interesting to determine, whether, for the secretion of these different structures, there occur also different conformations of the mucous membrane of the tubes.

When now the ovulum has passed out of the Graafian vesicle, the inner stratum of the latter, according to Von Baer, and in part also, according to Regner de Graaf, becomes, by exuberant growth, the so-called *corpus luteum*. This begins to take place while the ovulum is still contained in the Graafian vesicle. As soon, however, as the ovulum has left the vesicle, the greatest part of the latter is filled with a reddish, fleshy mass. In the centre alone, under the opening, there is found a cavity, either empty or filled with an albuminous mass, which cavity seems to be largest in man. It appears that the opening now, first of all, closes, whilst afterwards the cavity becomes smaller, until, at length, it entirely disappears. There are thus found in the ovary, yellow, reddish or bluish, bodies, of greater or less size, which are known under the name of *corpora lutea*.

These *corpora lutea*, falsely so called, (for in different animals they have constantly different colours,) are universally and properly regarded in the present day as the surest sign of a destroyed Graafian vesicle, and of an escaped ovulum, and, therefore, of impregnation having taken place. Although their form and origin have been justly indicated by earlier observers, my own observations on rabbits enable me to add yet many not unimportant particulars. The process here is the following. In consequence of conception, there arises a considerable congestion of blood towards the ovaries in general, and towards single Graafian vesicles in particular. The latter become pervaded with nets of fine blood-vessels, and increase in volume, though the larger vesicles alone seem to be comprehended in the process. With the commencement of this change, however, there appears, from the internal surface of the membrane of the vesicle, outwards, a reddish, fleshy mass, which takes in the whole circumference of the same, excepting the spot on which the ovulum is found, thus, with the exception of the most elevated point, covered by the peritoneum alone. By this, indeed, the quantity of fluid contained in the vesicle is necessarily reduced ; but it does not diminish in equal measure, with the appearance of the reddish mass ; becomes therefore relatively more abundant, and necessarily collects towards the side covered by the peritoneum alone. In this manner, that part of the vesicle covered only by the peritoneum, becomes pushed forth, while the ever-increasing reddish mass on the one hand, and the relatively too great quantity of the fluid of the vesicle on the other, operate as a *vis a tergo*. The ovulum itself reaches the most external point of the spot covered by the peritoneum alone. The latter becomes even thinner, and at last perforated, so that the ovulum slips out, whilst it is surrounded by very little, or none at all, of the fluid content of the vesicle. In the place of the vesicle, however, there is then formed a fleshy mass, with a small cavity in its interior, which, through a kind of duct, opens outwards. Now, the external opening becomes closed, through a small projecting wart, which appears at first still somewhat to increase in size, but afterwards, whilst the cavity in the interior becomes filled with the fleshy mass, diminishes, and at last entirely disappears ; so that then, finally, there is presented a globular, uniform structure, the *corpus luteum*.

If we compare the processes through which nature works the discharge of the ova from the ovary of birds and Mammalia, it is easy to see, how she is compelled, by outward circumstances, to bring forth the same effects in different ways. In birds, this happens through simple enlargement of the ovum generally, and of the yolk in particular. But since this does not apply to the Mammalia, she makes use of the first formation of the *corpora lutea* and of the content of the Graafian vesicle, in order, by means of a *vis a tergo*, to attain the same object. Yet, in both cases, there work, besides a mechanical, also vital powers, since the peritoneum and the membrane of the vesicle, at the point of egress are not merely mechanically lacerated, but more in an organic manner absorbed.

From the progress now presented of the formation of the *corpora lutea*, it is clearly evident, that the content of the Graafian vesicle, immediately after impregnation, has a most subordinate influence, and perhaps none at all. In the same way, the disk of the vesicle, in which the ovulum lies imbedded, can by no means be indicated as the blastoderma.

For, firstly, it is very questionable whether it passes into the tube or not. My own experience is in favour of the latter, though it does not, with all needful evidence, prove it.

Secondly, the blastoderma can lie only internal, not external to the ovulum.

But the disk cannot, in any way, immediately pass into the ovulum. It hence appears to be almost certain, that the Mammalia before impregnation, possess no germinal disk, but merely a germinal vesicle. The same entirely is the case in the ovum of birds also, in the earliest stages of its developement within the ovary.

After conception certain changes present themselves in the uterus and tubes, which are in part, a consequence of the universally heightened activity of these organs, in part, peculiar vital processes of the same. First of all, the whole system of the internal organs of generation becomes turgid. Many parts of the same, for example the *orificium uteri*, become almost black, from the quantity of the contained blood. The tubes and the horns of the uterus are distended, and the extremities of the former embrace the ovary. Whilst now the ovula are in the course of preparation to pass through the tubes, and to be fixed in the uterus, a process which in man appears to last 12 to 14 days;—there are found in the uterus many changed appearances, and products of secretion. In the uterus of the Mammalia the folds and tufts arise in a peculiar manner, as will be stated more in detail further on, and a considerable quantity of viscid matter is secreted on the internal surface of the uterus. In man also, something analogous no doubt occurs. Thus Home and Bauer are said to have found, eight days after impregnation, a layer of effused lymph, on the internal surface of the uterus, which formed fibres of tolerable length. John Burns, and more lately K. E. v. Baer, have observed similar appearances. Edward Weber found seven days after conception the inner layer of the substance of the uterus much reddened, and covered with a paler, softer, layer, from half a line to a line in thickness, which consisted of very many small perpendicularly-standing cylinders, united together by a slimy membrane. All the cylinders ended with a round unswollen extremity. Many of them had a length of from two to three lines, whilst the layer, where this was the case, formed folds. Vide something on this subject, further on, in the description of the *decidua*.

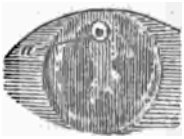
Finally, there would here be to mention the remarkable *glimmering motions* (Flimmerbewegungen) which Purkinje and I discovered in the mucous membrane of the oviduct of amphibious animals, birds, and Mammalia. Since, however, this phenomenon belongs to the perfectly formed mucous membrane of the genitals in all stages of their existence, and besides, to that of the organs of respiration, it cannot be here fully and particularly considered. I therefore refer to the account which we have given of this discovery in Joh. Müller's Archiv, and to our paper; *de phænomeno generali motus vibratorii. Wratisl.* 1825. 4.

Art. X.—*Some Remarks and Inquiries concerning the Germinal Vesicle (Vesicula germinativa.)* Translated from the German * of Professor Rudolph Wagner, of Erlangen, by Martin Barry, M. D., M. W. S., President of the Royal Medical Society of Edinburgh.

There is no doubt but that the acute *Baer* was wrong in regarding the entire ovum of the Mammalia and of man, as the germinal vesicle itself, a very pardonable error, considering the novelty and difficulty of the object, in which *Carus* † has followed him. *Purkinje* ‡ has already recently expressed his doubts of it, and this fortunate discoverer of the germinal vesicle in birds has justly explained the content of the Baerian vesicle as the yolk. Finally *Valentin*, § with the most successful talent for observation, and in connection with *Bernhardt*, has very lately exhibited the true germinal vesicle in the ova (Baerian vesicles) of very different Mammalia, and drawn a parallel between the entire Graafian vesicle, with its various contents, and the ovum of the bird. My less numerous researches accord perfectly in their results with those of Valentin, Bernhardt, and Purkinje; in the explanation of single parts, I can for the present do no more than receive their views. In the following I shall ask attention to a few points, which I recommend to my relative and colleague Valentin, for confirmation and further prosecution.

In *Fig.* 1. there is seen a Graafian vesicle of the sheep, slightly magnified, and represented as lying in the ovary; at *a* the minute ovulum surrounded by the known pellucid non-granulous space. In *Fig.* 2. is the ovulum with the Graafian vesicle, taken out. I found it $\frac{1}{15}$—$\frac{1}{20}$''' in diameter (about ten of them hav-

Fig. 1.



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* Müller's Archiv, Jahrgang, 1835, Heft iv.

† *Zootomie, 2d Ed. Tab. xx. Fig* 15. With neat delineation of the ovum of the swine.

‡ *Article Ei, in the "Berliner Wörterbuch," Band* x.

§ *Bernhardt Symbolæ ad ovi mammalium historiam ante prægnationem. Wratislav.* 1834. With a very good plate, drawn by Valentin.

ing been measured.) It is externally surrounded by a diaphanous membrane, which I with others, call chorion, without intending thereby to indicate the chorion as a covering of the fœtus. Between the chorion and the yolk-bag, there is a narrow diaphanous space. The yolk-bag presents a finely granulous mass, with single larger (probably fat) granules. With slight pressure, there appears the transparent germinal vesicle, *c*, which measures exactly $\frac{1}{30}'''$. It always contains a round, yellowish, apparently opaque, as it were granulous spot of $\frac{1}{200}'''$ in size, (diameter.) In *Fig*. 3, is particularly represented the germinal vesicle taken out of the yolk, with the spot. In *Fig*. 4, I have selected for comparison a somewhat maturer ovum of the rabbit, in which the yolk already contains numerous, large drops of fat. The ovulum generally measures $\frac{1}{13}'''$, but also from $\frac{1}{12}'''$ to $\frac{1}{20}'''$; the pellucid germinal vesicles, $\frac{1}{30}'''$ to $\frac{1}{70}'''$; the yellowish glimmering opaque spot, $\frac{1}{200}'''$. Once also I saw, instead of a single spot, two smaller ones, lying close together.

Fig. 2.

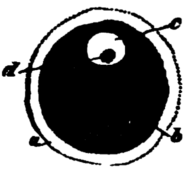


Fig. 3.

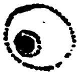
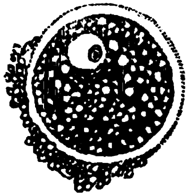


Fig. 4.



The spot has claimed my attention, because I have met with it in other classes of animals: whether constantly in vertebrated animals, I am still doubtful; but it is very distinct, for every observer in Phalangium opilio, ova of which, of different size and developement, I have delineated in *Fig*. 5. At *a* is seen a larger ovum, with pellucid chorion, and opaque yolk, which has already arched over the germinal vesicle. On the latter is seated the granulous spot. At *b*, the yolk has just advanced, and at *c*, is not at all perceptible as a layer of granules. Here also the minute germinal vesicle of $\frac{1}{100}'''$, is furnished with the opaque spot: the germinal vesicle grows for a while together with the spot; and at *Fig*. 6, as well as at *Fig*. 3, there is such a germinal vesicle particularly represented.

Fig. 5.

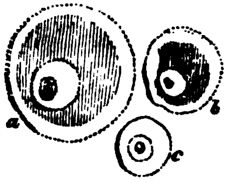
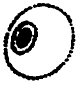


Fig. 6.

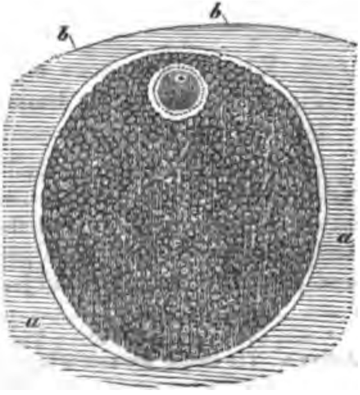


This spot, which I consider constant, at least in the Mammalia, I call the germinal spot (*Macula germinativa.*)

The germinal vesicle presents in the different classes of animals, various marks on its surface, which I shall point out in another place. I have now seen this germinal vesicle, besides in the animals named by Purkinje, also in Octopus, among the Gasteropoda, only in Patella. With some practice and acquaintance with the parts, one may find this delicate structure also in animals that have lain in spirit: its content becomes in spirit dark and opaque, as for example in fishes. I have not yet found the germinal vesicle in our native snails; whereas, in Unio and Anodonta, it is very distinct and firm; hence these animals are to be much recommended for the first observation. It constantly presents (in these animals?) two spots circular in form, which intersect each other, (varieties rarely occurring,) the larger of them may bear a certain resemblance to the germinal spot. I have quite recently seen the germinal vesicle distinctly, though without any mark (on its surface) in the Ascaris, but it was very minute: I could not with decision see it in the remarkably formed ova of the Tænia, and as little hitherto in the Distoma. In the cra-fish the germinal vesicle is very distinct; the granulous spot I did not find, and discovered it to be wanting also in Cyprinus, Gadus, and the Batrachia, while I found it very distinct in some ova of Salmo. It may be, that I have overlooked or mistaken it; still more probable is it, that it passes through metamorphoses, and depends upon circumstances which are yet to me unknown.

That in the human ovum there is present a germinal spot, appears to me probable. What may be its meaning? Does it stand in a certain relation to the embryo? Is it perhaps still further organized? How remarkable is what we know of the compound organization in the Mammalian and human ovum; it is a true encasing, (Einschachtelung)—in the Graafian vesicle lies the vesicle of Baer, in the Baerian vesicle, the vesicle of Purkinje. Is the germinal spot again to have its content? Hitherto, with an enlargement of 800 times, (diameters) I have not been able to discover any thing in it distinctly.

Fig. 7.



For further contemplation I have given in Fig. 7, a more schemal section of the Graafian vesicle of the sheep, represented in *Fig.* 1, and which in *Fig.* 7 is seen lying in the ovary. *a* is the germ couch, (stroma,) of the ovary, *b* the serous peritoneal covering. The Graafian vesicle presents a double membrane, and a granulous content; the ovulum itself is surrounded by the pellucid border, then next inclosed by the chorion, and shows a dotted yolk; within, lies the germinal vesicle, with the germinal spot. For observance of the germinal vesicle and germinal spot of the Mammalia, I recommend powerful enlargements of 300 to 500 diameters.

I wish that these remarks and inquiries may induce naturalists to make observations in the ensuing spring.

Supplement.

Since the end of last year (1834) I have unremittingly inquired into, and already prepared forty tables of drawings of, the ovum in the different classes of animals. It is thence shown:

1. That the primitive parts of the ovum are the germinal vesicle and the germinal spot, as is most satisfactorily demonstrable in insects; the yolk is added at a later period.

2. The germ is, at its first appearance, that which I have named germinal spot. It is a layer or granulous mass, which appears sometimes single as a spot (Mammalia, snails, insects, &c.)—sometimes forms several scattered globules, (Crafish, Fishes, Batrachia,) which at an earlier period I erroneously considered as drops of fat. It is fixed to the internal surface of the germinal vesicle, where it is immersed in the albuminous fluid of the same.

3. I have distinctly observed the origin of the germinal layer out of the germinal spot. This gradual metamorphosis from the minutest germinal vesicle, measuring at times less than $\frac{1}{100}$th of a line, to the mature ovum, the relation to the germinal vesicle, &c. is of great interest.

The number of animal species examined is very considerable, and my micrometric observations may be not far short of a thousand. I wish only yet to extend my researches among marine animals.[*]

ART. XI.—*Observations on the Experiments of Professor Panizza.* By S. D. BROUGHTON, Esq. F. R. S., &c. in a letter to the Editor.

SIR,—I HAVE recently read the details of Professor Panizza's experiments, in your Journal, with very great satisfaction, as they appear to be remarkable for accuracy and minute description, and to have been performed with considerable skill and perseverance. The subject of his experiments is difficult and obscure, but he explains his results in a manner calculated to inspire confidence and conviction. These experiments are more particularly interesting to me, from having so recently read a paper in Edinburgh, at the meeting of the British Association, upon the sensibilities of the cerebral nerves,—a subject of investigation to which Dr Marshall Hall and myself had been appointed at the previous meeting. Any confirmation, illustration, or contradiction of our experiments cannot but be acceptable from such an authority as that of Panizza, since we are all fellow-labourers in the same field, without distinction of country or nation, and ought to feel a common interest in the cause.

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[*] Note by the Editor, (Müller.) The supplement is taken from a letter of the Author's. The treatise was sent to the "Archiv" last year. (1834.)

I beg, for a few moments, to call the attention of your readers to that portion of Panizza's experiments which embraces the same points as those to which the attention of Dr Marshall Hall and myself was directed. The Professor includes in his investigations the communicating nerve of the face, the fifth pair, the hypo-glossal, and the glosso-pharyngeal. He also extends his researches to the spinal nerves, but, having no experience of these, I will say nothing about them at present. As to the first nerves, these are, in either parties hands, but a repetition of the labours of others, whose names are too well known to need mention. From the experience of the entire investigations, it is to be hoped, that these two interesting and curious nerves are now fairly understood. The other two nerves involve questions of so much obscurity, that the publication of Panizza's experiments on them, so soon after those of my colleague and myself, induces me to entertain a strong desire to put the results of both series in juxta-position.

1. *The Communicating Nerve of the Face, and the Fifth Pair.*—Upon the anatomical distribution of the communicating nerve of the face, and the fifth pair, I need say no more than that it precisely tallies with the dissection which I made of these nerves in the horse's head, as published, with a descriptive plate, in the London Medical Gazette, during the year 1829, (Vol. iii. p. 730.) exhibiting the two nerves before they unite, and are imbedded in the parotid gland, with the singular union made in their branching out immediately beyond the margin of the gland, whereby the division of certain branches destroys the functions of both these distinct nerves in certain parts to which the double branches are distributed. In other words, the functions of motion and sensation, or, as Panizza terms it, "tactile sensibility," are at once destroyed by such division.* This

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* Vide Descriptive Plate annexed.

union from a double origin and peculiar ramification of the two facial nerves explains the sources of previous errors and obscure results; for, whilst the branches of each in some instances, unite in parallel lines, each portion maintains its distinct property unmixed, when exclusively examined. The uniformity of opinion now existing, upon the properties of these nerves, is highly satisfactory; although I do not, of course, include that agitated question, as to whether the communicating nerve is one of voluntary motion or of respiration. For our present purpose it is sufficient to consider it as exclusively devoted to motion, as the other is to tactile sensibility. Reference, however, to the paper read at Edinburgh * will show grounds for reasoning upon this subject.

Considering the doubts which have been long entertained upon the question of the immediate seat or medium of the sense of taste in the tongue, and how much, as Panizza observes, the anatomical distribution of the lingual branches of the fifth pair of nerves has warped the judgment in the discussions, experiments on these nerves are abundantly interesting and valuable.

2. *Hypo-glossal Nerve.*—Panizza says he found this nerve, when pricked with the point of the scissors, showed no sign of consciousness, but the tongue was convulsed every time. After the nerve was divided the tongue could not be thrown into motion, but tactile sensibility remained, and also the power of discrimination by taste. The tongue lay flaccid within the mouth, and could not be protruded, but when the animal was forced to compress it between his teeth, as also when it was pricked, he exhibited signs of pain. His obvious disgust at the introduction of juice of coloquintida into food, and its rejection, showed the sense of taste to be present; for food without the bitter he gulped voraciously.

Dr Marshall Hall and myself found that "no mechanical irritation upon the trunk of this nerve produced any sign of sensation, nor was its division attended with any movement. But when it was pricked slightly at intervals the muscles of the tongue were set in motion." So far the experiments of Panizza exactly correspond in result, the hypo-glossal being simply a nerve of motion to the tongue.

Lingual branches of the fifth Nerve.—Panizza, having renewed the same trials upon the lingual branches of the fifth pair, as a converse experiment, found that "the animal gave indications of suffering the most acute pain, without any motion of the tongue appearing." And having divided these nerves he found not only that tactile sensibility was destroyed, but that the sense of taste was left in full force. So that the division of two sets of nerves, the hypo-glossal and the lingual, whilst it destroyed motion and tactile sensibility, left *taste* remaining.

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* Vide Transactions of the British Association, Vol. ii.

Dr Marshall Hall and myself satisfied ourselves of the tactile sensibility remaining after the division of the hypo-glossal and glosso-pharyngeal nerves, the lingual branches remaining entire.

3. *Glosso-pharyngeal Nerve.*—A dog was selected to try the sensibility of this nerve upon, and when Panizza divided it on both sides *no uneasiness or convulsions of the tongue occurred* nor when previously pricked. Tactile sensibility and motion remained. Dr Marshall Hall and myself met with the same result.

But the coloquintida being applied showed that the sense of *taste* was lost, whilst tactile sensibility remained, as well as motion. The animal could masticate, lap, and swallow food offered him, and could not recognize the abhorrent flavour of the coloquintida.

Finding that motion and tactile sensibility remained, after the division of the glosso-pharyngeal nerve, and not being able to bring the root of the tongue into view, Dr Marshall Hall and myself adopted the suggestion, that the office of this nerve may possibly be to govern the motions of the back part of the tongue.

But Panizza's experiments with the coloquintida show this suggestion to be erroneously formed, and leave no doubt of this nerve being the medium of the impressions of *taste*. The light thus thrown upon the seat of this specific sense is very satisfactory, and the deficiency in our researches here supplied by the Italian Professor is fully worthy of consideration, and of being proved in this country, although it appears to be most clearly demonstrated, and with great truth and accuracy.

Panizza found, as we did, that when life was scarcely extinct, the act of pinching the exposed hypo-glossal nerves was followed by motions of the tongue, and pinching the lingual and the glosso-pharyngeal was attended with no movements whatever.

It results, from the combined series of experiments instituted by Professor Panizza on the one hand, and Dr Marshall Hall and myself on the other, as far as regards the nerves concerned in the functions of the tongue, that my colleague and myself are corroborated and supported in our inquiries, and their results, by the Professor's investigations, as far as ours go. We have not yet investigated, indeed, the question of *taste*; and this Panizza has done to all appearance satisfactorily.

I regret that the Professor has not investigated the properties of the other nerves, to which the attention of myself and my colleague has been directed, the *vagus*, the spinal accessory, and the sympathetic. It will be desirable for him to do so.

The final results of all the comparative inquiries, here alluded to, may be thus summed up. The communicating nerve of the face, and the fifth pair, arising by distinct roots, send off branches, as these emerge from the bed of the parotid gland, some of which unite in parallel lines, and others do not, each ramification retaining the original property of its own root unmixed, the one being destined to govern certain motions of the different parts of the face, and the other devoted to tactile sensibility, as far as the superficial organs of the face go. Upon this there is no disagreement; and the whole developement has been arrived at by repeated experiments on the part of different persons. I may here add, that, as to the question of the peculiar function of the seventh nerve *(portio dura)* and of the eighth also, as alluded to in the paper (already noticed) in the British Association's Transactions, and in reference to Sir Charles Bell's system, my friend Dr Marshall Hall has, I believe, some interesting facts in hand and about to be published. And, I trust, that, ere long, the general agreement upon this hitherto speculative part of the subject before us will be satisfactorily completed.

In the next place, it appears, that the hypo-glossal nerve governs the motions of the tongue, deglutition, and mastication, without interfering with common sensation and taste. And the instinctive and voluntary motions of the tongue are all destroyed by dividing this nerve.

The next position is, that the lingual branches of the fifth pair of nerves are devoted to tactile sensibility, or the common sensations of the tongue, and their division does not affect the motions of that organ nor its powers of taste, both remaining entire.

Lastly, when the glosso-pharyngeal nerve is divided the sense of taste is lost, whilst, the other nerves being uninjured, motion and tactile sensibility remain entire.

In all these general results, excepting the medium of taste, the experiments of Dr Marshall Hall and myself coincide. But, as to those peculiar phenomena, neither of tactile sensibility or taste, which so forcibly presented themselves to our notice, we are left alone, for they have not been alluded to by Panizza, who does not appear to have examined the seventh and eighth nerves, as we have, in relation to their respiratory influence.

It appears, then, that the problem of the medium of taste is now solved, and by a simple appeal to experimental physiology. And, it is doubly satisfactory to find, that this successful appeal is confirmed by analogy and comparative anatomy. Mr Owen, of the College of Surgeons' Museum, whose knowledge of comparative anatomy is well known, observed, and the observation is recorded in Dr Todd's Cyclopedia of Anatomy and Physiology, that he never could discover in the tongues of birds any nerve corresponding with the *lingual*, or *gustatory*, as it has been erroneously called. But, he always observed, that the *glosso-pharyngeal* nerve was freely distributed, and terminated in the soft papillary substance of the tongue. And, moreover, that in Mammiferæ with horny or hard cuticular coverings of the tongue, the supposed gustatory nerve invariably is lost in these parts so covered, much as the fifth nerve sends branches to the strong whiskers of the seal, the cat, and other feline animals. Nor can it be overlooked by the physiologist that a striking analogy exists between the glosso-pharyngeal and the optic nerve and retina. The former has no common sensation, is not subservient to tactile sensibility or motion, but is the medium of a specific sense exclusively of all other sensations. And, the latter are insensible to common feeling, or sensation, they influence no muscular action, but receive and convey the impressions of one exclusive sense.

In thus laying before you this short comparative review of what has been recently done at home and abroad upon the sensibilities of the cerebral nerves, I trust I am not unprofitably usurping a portion of your excellent Journal, but rather fulfilling one of its ends and objects. The physiologist must contemplate with gratification the reduction of the hitherto somewhat problematic functions performed by the tongue to a simple and beautiful system of arrangement. Its complex movements are governed by one pair of nerves, and its tactile property by another; and, its being endowed with the power of propagating the impressions of a specific and discriminating sense, has, in accordance with the known laws and analogies of nature, caused it to be supplied with a special nervous arrangement accordingly.—I remain, &c.

Explanation of Figure 4th, Plate V. representing Mr Broughton's dissection in 1829, of the Fifth and Seventh Pairs of Nerves, since followed by Professor Panizza.

A. Facial branch of the fifth pair.
B. Seventh pair, *portio dura* or communicating nerve.
a. A branch from the seventh pair proceeding towards the posterior edge of the lower jaw.
b. A branch of the fifth pair, going with
e. A branch of the seventh pair, to the mouth.
c. Second or descending branch of the fifth pair, crossing the branch *a* of the seventh, in its course to the posterior part of the lower jaw.
d. A superior or second branch of the seventh pair uniting with
f. A superior branch of the fifth pair.

ART. XII.—*Comparative Ratio of Mortality, deduced from the Official Reports and other documents in the Office of the Army Medical Board.* By HENRY MARSHALL, Esq. Deputy-Inspector-General of Army Hospitals.

OUT of every 1000 men in the following stations, the annual ratio of mortality is as under stated, and by the following classes of diseases:

Diseases.	*Windward & Leeward Islands.*	*Bengal.*	*Madras.*	*Bombay.*	*Gibraltar.*	*Scotland.*	*Jamaica.*	*Ireland.*
Fever, .	37.9	16.5	11.0	15.0	2.4	2.3	112.5	
Diseases of lungs,	10.3	2.3	2.3	2.4	5.8	4.6	7.4	
do. of liver, . .	1.8	4.0	5.0	5.0	0.2	0.2	0.5	
do. of bowels,	18.8	20.4	20.5	16.1	1.8	0.2	4.2	
Cholera, .	0.0	14.2	8.0	10.3	0.0	0.0	0.0	
Diseases of head,	3.1	2.0	0.6	1.2	0.2	0.2	1.6	
Dropsy, .	2.0	0.5	0·7	0.7	0.3	0.8	1.0	
Other diseases,	6.3	3.1	3.9	4.1	2.9	2.7	3.8	
Ann. mortality,	80.2	63.0	52.0	54.8	13.6	11.0	131.0	15.0

PART II.

CRITICAL ANALYSIS.

Art. I.—*Observations on a Stridulous Affection of the Bowels; and on some varieties of Spinal Disease, with an Appendix of Cases.* By J. Bradley, M. D. London, 1818. 8vo. pp. 283.

Though eighteen years have now elapsed since the appearance of this work, and though it may be regarded as the first English treatise expressly devoted to the consideration of that assemblage of anomalous and proteiform complaints, to which modern medical nomenclature has restricted the epithet of Spinal Irritation, yet it is a remarkable proof of the caprice of fortune in awarding reputation, and of the apathy of many of our profession to the literary history of its doctrines, that the work of Dr Bradley is almost unknown, and is never mentioned, either by the authors who treat of Spinal Irritation, or by those who have examined their writings.

This circumstance forms a sufficient reason for directing the attention of our readers to the contents of the treatise of Dr Bradley; and we shall take the same opportunity to consider briefly the steps by which physicians and surgeons have been gradually led to attach to these disorders, the importance with which they are at present invested.

The records of medicine show that pathological observers have been long aware of the intimate connection subsisting between the nervous system and the other organs of the animal frame, and that the sound state of each was so dependent on that of the other, that in many forms of bad health derangement of the nervous system either was followed by disorder in the organs subjected to its influence, or derangement in the actions or structure of any of the organic systems gave rise to some disorder in the functions proper to the nervous system. Though all the organs concerned in the process of digestion, as well as those devoted to the functions of respiration and circulation, have been observed by physicians to evince proof of this mutual connection, and the consequent action and reaction, yet it is principally in various divisions of the former class of organs, viz. those devoted to the alimentary function, that the effects of this bifarious and reciprocal influence have been remarked. The facts observed lead to the establishment of two propositions. The *first* is, that disease taking place in the alimentary canal or its appendages, and deranging the chylopoietic function, may give rise to disorder in the nerves distributed to that part of the body, and thereby to their nervous collateral connections, and to the nervous system generally. The *second* proposition is, that disease taking place in the nerves, either at their origins or central extremities, or in their course, may be followed by an unhealthy state of the organs to which they are distributed, and, according as the part primarily affected is limited or extensive in its connections, this disorder of the central extremities of the nerves may induce disease either in the organs devoted to the alimentary function, or in those devoted to respiration or circulation, or in the muscular motions and sensations, or in all these assemblages of organs simultaneously or successively.

Though sufficient evidence of the fact, that these propositions have been more or less generally believed by the majority of physiological and pathological authorities, might easily be adduced, yet it would lead us into a discussion much too extended and elaborate for the limits assigned to the present inquiry, were we to enter into the matter in a manner commensurate with its importance and complexity. To form a just view of the merits of the inquiry and of the claims of each author to originality, it is indispensably requisite, nevertheless, to advert to the principal and most essential facts and arguments. We shall therefore take a brief view of the facts in support of the two propositions, as they are given in the writings of various physiologists and pathologists, beginning with those relating to the first proposition.

1. Hippocrates observed in the voluntary muscles a species of impaired motion, to which he gave the name of *Paresis*, supervening in consequence of disorder of the digestive function, and which he conceived to depend on the presence of black-bile. According to John Gottfried Brendelius, who made this the subject of a Commentary in 1752, this paralytic disorder, which affects the tongue, one arm, or a single leg, is common in persons with impaired digestion, tardy bowels, and pain in the hypochondriac regions, especially the right hypochondre, not unfrequently with hemorrhoidal efforts or actual hemorrhoidal discharges from the *rectum*. Motion is not entirely lost, and some sensation remains. The fingers are often affected with spasmodic twitches, and the impaired motion of the tongue causes stuttering. In some instances Brendelius allows that this species of palsy may depend

on worms[*]—an opinion in which he was anticipated by Salmuth.

Galen followed Hippocrates in teaching the influence of morbid states of the intestinal canal, in inducing certain forms of nervous disorder, especially palsy, epilepsy, and convulsions.

A similar doctrine is inculcated by Aretaeus in two several passages of his writings. In the first, when treating of affections of the stomach, (*περι των Στομαχικων*), he enumerates, as consequences of extreme disorder of that organ, squeamishness, mental dejection, impaired vision, ringing of the ears, weight of the head, insensibility of the members, (*ναρκη μελεων*), and paralytic resolution of the limbs, (*και τα γυια λυονται*). In a subsequent passage, when treating of what he terms the Disposition of the Stomach, after stating, that, by indigestion, that organ is the seat of frequent flatulent and offensive eructations, and if these pass downwards, the bowels are the seat of a stridulous sound, (*τρυζει τα εντερα*,) he afterwards adds, that the suffering of the stomach is severe, like a puncture occasionally; and in the meanwhile, the patient becomes thin, pale, atrophied, and listless, unfit to perform any of his usual duties; and if he attempt to walk, the limbs are paralytic, and the temporal arteries unusually prominent,—an evident proof of atrophy, he adds, since in atrophy the temples of the patient are hollow.[†]

This connection between disorder of the intestines and loss of motion in the voluntary muscles, was still more decidedly admitted by Paul of Aegina, who states that a disease resembling colic affected many persons in Italy and the different countries of the Roman Empire, and terminated in some in epilepsy, which was generally the precursor of the fatal event, in others in palsy without loss of sensation, when recovery took place, and in others in a disease partaking of the phenomena of both.[†]

By modern physicians we find that similar facts had been observed, and similar conclusions deduced. Not only were similar instances of palsy succeeding to long-continued severe pains of the bowels, observed by Gonthier of Andernach,[‡] Houillier,[§] Trincavella,[||] and Volcher Coiter of Groningen; but the latter author, who had observed with particular care examples of this form of impaired motion, had inspected the bodies, and examined with an attentive eye the state of the different internal organs. He is the first anatomist who examined carefully the interior of the spinal column, with the view of ascertaining the influence of the state of the spinal chord and its membranes, in inducing this diminished power in the voluntary muscles. He informs us, that, besides enlargement of the liver, distension of the stomach with green fluid, distension of the *caecum* and the transverse arch of the colon with air, and the rest of the bowel filled with thick scybalous excrement,—he found thin reddish water in the ventricles of the brain, and the space between the *dura mater* and *pia mater* of the spinal marrow filled with a similar fluid. "Totum spatium quod in sacra fistula inter tenuem et duram membranam est, et ubi nervorum funiculi, nervos constricturi, a spinali medulla recedunt, simili aqua plenum extitit."*

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[*] Joan. Gottofr. Brendelii, Opera, Progr. xxxi. de Paresi Atrabiliaria Hippocratis.

[†] *Πονος της κοιλιης βαρυς ὁκοιον νυγμα ἀλλοτε και ἀλλοτε, ἴσχνος δε και ἀτροφος ανθρωπος, ὤχρος, ἀδρανης· ουδεν τι πρηξαι των συνηθων ἐυτονως, ἀλλα κἢν βαδιζη, λυεται τα μελεα, φλεβες κροταφων επηρμεναι, ατροφιη γαρ κοιλοκροταφοι.*—Aretæi Cappad. Lib. ii. Cap. vii.

[*] Pauli Aegineta, Lib. iii. cap 43.

[†] Andernacus in Comment. Pauli Aegineta.

[‡] Hollerii de Morbis internis.

[||] Trincavella de Ratione curandi part. hum. corp. affect.

It must be inferred, that since Coiter had thus found proofs of deranged circulation within the cavity of the spinal column, though he restricts his explanation chiefly to the sympathy between the brain and the stomach, he was quite aware of the morbid state of the former parts of the nervous system. This was distinctly understood by Platerus, who, in remarking the compound character of the symptoms, partly paralytic and partly convulsive, allows that it was generally agreed that this proceeds from lesion of those nerves of the spinal marrow, which are distributed to the external parts, and that certain formidable symptoms observed by himself, as hoarseness or *aphonia*, difficulty of swallowing, and various spasmodic forms of breathing, were to be ascribed to affection of the nerves sent by the sixth or seventh spinal pair to the muscles of the *larynx*, the diaphragm, and the stomach.†

So far as we can judge from the testimony of the learned and judicious Schenkius, there is no reason to believe that the intestinal disease here adverted to was the effect of poisoning by lead, of the deleterious effects of which all of them were aware. The only disorder to which it makes any approach, and with which it could be liable to be confounded, is the Creeping Distemper or the *Raphania* of Linnæus, but from which it differs in the absence of gangrene of the extremities *(ustilago,)* which is never mentioned by any of the authorities now referred to.

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* Volcheri Coiteri Observationes Anatom. et Chirurgic.

† Post colicos cruciatus diu perseverantes plerisque ex nostratibus membra quædam resolvuntur vel convelluntur, aut ex hisce veluti mixtus affectus cum dolore uterum vehemente nascitur; quod, uti a dorsalis medullæ nervis laesis, qui ad exteriores partes feruntur, prodire, omnibus constat; sic ab affectu nervorum quos sexta aut septima conjugatio interioribus partibus, veluti musculis laryngis, septo, ventriculo, aliisque transmittit, gravem quoque symptomata iisdem quoque provenire in multis observavi, qui, praeter quam quod, resoluti vel convulsi sunt, submisse et rauce loquuntur, cum difficultate deglutiunt, et cum tussiunt vel rident, cum sibilo, stridore et pectoris quadam angustia convelluntur et veluti suffocantur. Plater de Observ. Propriis.

The successors of Coiter and Platerus appear to have entertained the same views on this species of loss of motion ensuing on intestinal disease. Julius Cæsar Claudinus, Professor of Medicine at Bologna, after stating that several of his contemporaries had shown a disposition to claim to themselves the merit of recognizing a species of spurious palsy *(Pseudo-paralysis,)* succeeding to pains of the loins and intestines, adds, that this disorder is peculiar to certain parts of Germany; that in the persons attacked by it the hands and feet continue to lose power, until they become immovable; and that this spurious palsy is merely a species of atrophy proceeding from disease and pain of the intestines and kidneys, by which he evidently means the lumbar region. A similar form of palsy had been observed by Hildanus, and also by Smetius; and Schneider, who was acquainted with these facts, adds, from his own observation, others, in which irritation in the intestinal tube had given rise either to convulsions, to epilepsy, or to palsy. Nor must it be imagined that these were mere examples of the palsy succeeding to the introduction of any of the saturnine salts. Of this source of palsy Schneider was well aware, but distinguished it from that which resulted from the irritation of the intestinal tube and its nervous chords.[*] *Lastly*, it may be observed that Van Swieten, who had examined with much attention the history of this paralytic disease, though aware of the possibility that it might have proceeded from saturnine poisoning, concludes, however, that since, in many patients, after attentive examination, he could recognize no proof of the presence of lead, the appearance of the disease was quite unconnected with that cause.[†]

In other instances it has been observed by physicians that disorder of the alimentary function and the intestinal tube, if it did not directly induce irregularity or loss of motion in the voluntary muscles, might do so indirectly. Thus Sydenham observed that Hysterical and Hypochondriacal patients occasionally became paralytic;[‡] Adolphi observed in *hysteria*[||] similar symptoms of loss of voluntary motion; Cirillo details at length an interesting case, in which a nun of noble rank, aged 25, was attacked first with hysterical symptoms, then with tetanic spasms, then with spasms and imperfect palsy of the extremities, then with hysterical and dyspeptic symptoms, then suppression of urine, then dysenteric symptoms, and again suppression and retention of urine with persistence of the paralytic state; [*] and lastly, Rahn remarks that paralytic attacks are common in cases in which hypochondriacal or hysterical ailments have become inveterate, and are, as in similar circumstances, associated with obstruction and other diseased states of the abdominal viscera.[†]

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[*] Conradi Victoris Schneideri, Liber de Nova Gravissimorum trium Morborum curatione, &c. Francofurti, 1672, Liber de Paralysi, Cap vi. p. 1052, &c.

[†] Commentarii, Vol. iii. §. 1060, p. 357.

[‡] Sydenham, Opera.

[§] A. N. C. Vol. i. obs. 238.

Before quitting this part of the subject, it is further requisite to notice shortly the doctrines of John Fiens or Ficnus of Anvers, who published in 1592 a sensible and curious treatise or commentary on flatulence, and its effects on various parts of the human body. It was not easy to introduce the notice of the doctrines taught by Fiens under the head of the writings already referred to; but it is nevertheless necessary in this place to advert to these doctrines, as they make a near approach to one part of the views given by Dr Bradley, that relating to the stridulous affection of the bowels.

The Commentary on Flatulence gives a very just view of the symptoms of those forms of dyspeptic disease which are similar to the *Asthenia* of Sauvages and Willan, the Nervous Atrophy of Whytt, and the more violent forms of hysterical and hypochondriacal disease.

Wind in the stomach and intestines, he represents to give rise to tensive wandering pains in all parts of the body, like sharp darts, at one time under the nipples, at another under the *scapulae*, or the *periostea* of the ribs; tingling of the ears, palpitation of various parts, yawning, and tetanic spasms affecting the legs, arms, and fingers. When, by the excessive quantity of mucus, the passages are obstructed, the exit of excrement is impeded; and the air intercepted in the tortuous folds of the intestines moves about and causes violent torment. If, from this cause, pain arise in the colon, patients experience a sense of tension, and feel murmuring noises, sudden pains, motion of the wind to and fro, as if attempting to escape without avail. Wind, indeed, is rarely expelled during the height of the evil; for it is obstinately retained on both sides; and any eructations that take place afford no relief. Sometimes the complaint is accompanied with swelling and prominence round the orifice of the stomach, and sometimes with pain extending backwards to the spine and *vertebrae*, sometimes over the whole chest, and sometimes it affects patients in both parts. "*Dolor etiam aliquando retro juxta spinam ejusque vertebras aliquando etiam juxta totum thoracem ingruit, saepe autem utrinque occupatos habet.*"

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[*] Consulti Medici di Niccolo Cirillo, Professor Primario di Medicina. Venezia, 1756. Tomo iii.

[†] J. H. Rahn de miro. inter Caput et Viscera abdominis Commercio. Gottingae, 1771. §. xxxv.

It is not difficult here to perceive a close resemblance between the Stridulous Affection of the bowels of Dr Bradley, and the painful sensations in the spine.

Fiens then proceeds to consider more extensively the effects of this dyspeptic and intestinal disorder in the production, *first*, of *vertigo*, and sick headach; *secondly*, of tingling in the ears, the murmur of waters, the sound of musical instruments, and all the various noises within the head with which patients in this state are distressed; *thirdly*, of neuralgic toothach; *fourthly*, of pain referred to the lungs, and sometimes, though rarely, hemorrhage; *fifthly*, of spurious pleurisy (*pleuritim mendosam*;) *sixthly*, of palpitation of the heart (*Palmus*;) and *seventhly*, of various pains referred to the stomach and bowels, and giving rise to pain in the spine and the lumbar region, which was liable to be mistaken even by able physicians for nephritic or nephralgic disorders. His remarks on the course of these pains make an approach so close to those of several of the modern authors, but especially of Dr Bradley, that they deserve to be more generally known than they appear to be.

"Ab his (inflationibus) ventriculus misere contorquetur et dolores usque ad dorsum descendunt. * * * Posterior pars universa spinæ insidet, cum qua ad primam usque lumborum, vertebram adhaerescens colligatur. Os autem illius non spinae sed diaphragmati, jocinori, cordi, lieni, intestinis, aliisque partibus communione membranarum, nervorum, arteriarum, et venarum connectitur. Unde fit ut quoties ventriculus a flatuosis spiritibus vehementius distenditur, illius doloris participes maxime fiant illae partes quae distensae ventriculi parti, mutuo nexu conjunguntur. Quapropter cum posteriores ejus partes potissimum a spiritu distenduntur, tum maxime *dolor spinae lumbisque insistit et renum regionem acutissime invadit*, non aliter quam si difficillime nephritide quis excruciaretur; quae res non modo plebi verum etiam doctissimis in arte magistris interdum imponit, ut existiment renum calculo laborare eos qui a distrahente flatu male habent."[*]

It is most important to observe, that the language now given, if divested of its hypothetical dress, and interpreted in the usual mode, implies that Fiens had seen disorder of the stomach and intestines accompanied with much flatulence, give rise to acutely painful sensations in the spine, and occasionally imitate the symptoms of inflammatory disease in the viscera of the chest and belly.

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[*] Joannis Fieni Andoverpiani de Flatibus humanum corpus molestantibus. Commentarius. 1592. p. 61, 62.

Upon the evidence of these and many more facts of similar character Heineken considered, in an elaborate dissertation published at Gottingen in 1783, the influence of disorder of the abdominal viscera, in inducing diseases of the nervous system, and has given in this subject a most full and methodical classification of all the most authentic and pointed facts. This collection of facts furnishes abundant evidence that diseases of the abdominal viscera, by acting as irritants to the nerves distributed to these organs, may induce various disorders in these nerves themselves, and in the central parts of the nervous system, with which they are connected; for example, in the brain, cerebellum, or spinal marrow, in the ganglions, or in the large branches of the splanchnic nerves, and thus, in various organs connected with the abdominal viscera, by means of nervous communications only. * From all these facts, therefore, it must result that various disorders of the intestines, affecting probably the nerves distributed to them, may, by a reflex operation, give rise to paralytic affections of the voluntary muscles. It is hence that Kirkland and Abernethy have spoken of a species of nervous palsy, in which the loss of motion was believed to originate not in the brain, cerebellum, or spinal marrow, but in the intestinal or chylopoietic viscera, and which was believed to depend chiefly on disorder in these organs.

2. It rarely, however, happens that in pathology two or even more different views of the same class of facts may not be taken. The intestinal disorder which seemed to precede the paralytic might either have accompanied it, and consequently might be inferred to have been the effect of the same general and common affection in the central part of the nervous system, or it might have been the result of some disorder affecting primarily, either at their origin or in their course, the nerves distributed to the abdominal *viscera*, and then consecutively the extreme ramifications of those nerves both towards the abdominal organs, and sympathetically in another direction, the origins of those nerves which are distributed to the muscles of voluntary motion. To any one who reflects on the complexity and difficulty of the subject, both physiologically and pathologically, it will not appear wonderful that these opposite views of the same phenomena have been taken, and that many of the most eminent writers on pathology have either virtually, or directly and expressly, maintained the distemper of the nervous system to be the primary and incipient link in the chain of morbid phenomena.

Pathological writers have been long impressed with the belief, that many, if not all, the disorders incident to the human frame, either arose from a morbid state of the nervous system, or were in some measure connected with, and maintained by, a morbid state either of parts or the whole of that system. The part supposed to be performed by the nervous system in this mode of producing disease has been variously estimated by different authors; some believing that the agency of the nervous system was necessary to the production of all forms of disease, others that only particular families of disease were in this manner produced. In modern times, the facts and arguments illustrating this influence have been stated and examined with various degrees of minuteness and care, by Willis,* Hoffmann,† Boerhaave,‡ Rega,§ Langhans,‖ Whytt,¶ Pomme,** Tissot,†† and Rahn.‡‡ These authors have, however, with few exceptions, been contented to indicate in a general manner, the facts conceived to establish this influence, and have rarely attempted to specify particular divisions of the nervous system, as concerned, or believed to be concerned, in the production of various forms of morbid phenomena. Willis indeed maintained that a morbid state of the nerves of the eighth pair and great sympathetic chord was the cause of hysterical and hypochondriacal disorders, and took particular pains to refute several notions taught by Highmore on this subject, which he believed to be untenable and erroneous; and Hoffmann in various parts of his works, but especially in the chapter on the consent or harmony of nervous parts, enforced and illustrated this doctrine with increased pains and precision.

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* Jo. Heineken de Morbis Nervorum eorumque frequentissima ex abdomine origine. Gottingae, 1783.

Perhaps a still more decided exception from this general character ought to be made in favour of Daniel Langhans, who in a dissertation published at Gottingen in 1749, *De Consensu Partium*, after a correct view of the anatomical connections, ramifications, and distribution of the intercostal and splanchnic nerves, entered more minutely than any of his predecessors into the consideration of the influence of these nerves upon the phenomena of various nervous diseases, and explained ably and happily many phenomena, both of the state of health and disease, by means of the mutual communications of the nervous system.

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* Thomae Willis Cerebri Anatome. Pathologiae Cerebri et Nervosi Generis Specimen; et De Anima Brutorum. Opera, Amsteladami, 1682.

† De Rationalis Therapiae Medicae Fundamentis, &c. Cap. v. De Consensu partium Nervosarum, in Opera, Tom. i. p. 308. Genevae, 1761.

‡ Hermanni Boerhaave Praelectiones Academicae de Morbis Nervorum, quas edi curavit Jacobus van Eems, Med. Leydensis, Tom i. and ii. Lug. Bat. 1761.

§ Henrici Josephi Regae D. M. &c. Tractatus Medicus de Sympathia.

‖ Danielis Langhans de Consensu Partium. Gottingae, 10th April 1749. Halleri, Disputat. ad Morborum Historiam et Curat. Tom vi. Lausa.

¶ Observations on Nervous Diseases, 8vo ed. 1763, et Opera.

** Traité des affections Vaporeuses des Deux Sexes, 2de edition, Lyon, 1765.

†† Traité des Nerfs et de Leurs Maladies, par M. Tissot. Paris, 1778.

‡‡ Joannes Henricus Rahn de Miro inter Caput et viscera Abdominis Commercio. Gottingae, 1771.

Among other interesting observations, we find he ascribes great influence to the circumstance of the heart receiving its principal nerves, not from the brain, but from the spinal marrow itself; in consequence of which he argues, when these nerves are compressed or injured, the energy left to the organ is small, and corresponding only to that of the few nerves of the eighth pair, and the first branch of the intercostal proceeding from the head. He then adds, that in *paraplegia*, not only the external members and the muscles of the chest and belly suffer, but also most of the internal viscera which receive branches from the intercostal nerve. The reason of which he infers to be manifestly, because the intercostal trunk is principally formed from the branches of the spinal nerves, each of which, excepting the third, fourth, and fifth pairs, communicates by its anterior branch with the intercostal nerve.[*] The whole essay is highly interesting, and may be regarded, with the chapter of Hoffmann, already referred to, as the source of the instructive observations of Whytt on the same subject.

Whytt and Tissot, on the other hand, were contented with maintaining the proposition that, in these distempers, the nerves generally were disordered; and appear to have thought it either impracticable or unnecessary to specify more particularly the part of the nervous system conceived to be chiefly affected.

The hint thrown out by Langhans in the passage above quoted may be regarded as the germ of the doctrine of the influence of the spinal chord in the phenomena of nervous maladies. It appears, however, to have lain unnoticed and unimproved for several years; and pathologists satisfied themselves with repeating the general statement, that it was affected in many varieties of palsy, by serous fluid trickling down from the fourth ventricle of the brain, and compressing in the lumbar region the origins of the nerves.

3. The first pathologist who, in modern times, appears to have considered with particular attention the influence of the spinal chord in the production of various painful disorders, was Christian Gottlieb Ludwig, Professor of Medicine in the University of Leipsic; and to this inquiry he was led, by observing, in persons otherwise healthy, idiopathic pains of the spine, which, though generally ascribed to luxations or subluxations of the *vertebræ*, ought to be explained by flatulent, ligamentous, and muscular tensions of that part, considering the anatomical connection and dis-

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[*] "In paraplegia multum non solum externa membra patiuntur, musculique pectus et abdomen cingentes, sed et interna pleraque fere viscera quæ a trunco intercostali ramos accipiunt. Ratio ex præcedentibus satis patet; truncus enim intercostalis maxima ex parte ex ramis nervorum spinalium efficitur quorum quilibet, excepto tamen pare tertio, quarto et quinto, ramo suo anteriori nervum intercostalem adit.—De Consensu Nervorum, Section. iii. §. xcv.

tribution of the intercostal or great sympathetic nerve.* Though the exact origin of this nerve, he observes, is involved in doubt, yet its uniform and certain connection with all the nerves of the spinal marrow, its singular mechanism in so many ganglions, its evident conjunction in plexuses with other nerves, especially the pneumogastric, so as to be associated with almost all the other nerves, particularly demand attention in the explanation of symptomatic motions; and it is especially important to bear in remembrance its abdominal connection. *Spinalis medulla cum multis et praecipuis corporis humani nervis conjungitur; propterea dolores ex aliis quoque causis oriundi, ad hanc medullam spinalem transferuntur.*

Ludwig then reminds the reader, that the intercostal nerve descends along the whole spine, and besides, in the back transmits inwards to the bodies of the *vertebræ*, collateral branches, from the concurrence of which is formed a Collateral nerve, the Splanchnic or visceral, which in its connection with the *par vagum*, and especially in forming the semilunar ganglion, or rather plexus, and not less in other plexuses, regulates in numerous functions the energy of the abdominal *viscera*, and thus maintains with the spinal nerves a most evident connection, the accurate investigation of which may illustrate various spasmodic motions in explaining the phenomena of disease. He especially impresses the fact originally observed by Winslow, that the filaments of the dorsal nerves united with the intercostal nerve in the chest are comparatively small, while the nerve is of considerable thickness and forms also a collateral nerve; but below the diaphragm, where the intercostal nerve descends more upon the bodies of the *vertebræ*, the communicating filaments from the lumbar nerves are comparatively larger, though the nerve itself appear to be smaller. From this arrangement he thinks it may be justly inferred that the sympathetic tensive sensations in spasmodic diseases are more evident in this region of the spine.

Ludwig is the first author who proposes to distinguish this disease, which he reasonably claims as a discovery of his own, by the name of *Rhachialgia* or Spine-ache *(cum ῥαχις spinam dorsi et αλγεω, doleo, denotet)* because its character is an aching sensation referred to the back-bone. Sauvages, indeed, he observes, in his account of the DOLORES or painful sensations, refers this affection to colic, and that of Poitou, because Astruc, hypothetically, indeed, had limited its cause to an affection of the nerves of the spinal marrow. He found it not less difficult to refer the idiopathic pains of the spinal column to the head of *Lumbago*, since only one species, viz. the tenth, made any approach to the malady observed by him.

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* Adversaria Medico-Practica, Vol. i. Pars. iv. p. 711, Tractatio de Doloribus ad Spinam Dorsi. Lipsiæ, 1770.

After making these distinctions, and adverting to the name *Notalgia* or back-ache, employed by Delius to designate the pains of the back observed in catarrh, fever, colic, and similar diseases, he proceeds to consider, *first*, the symptomatic pains of the back explicable by affection of the spinal marrow or its investments, or the nerves which issue from it, and then enters more fully into the examination of those idiopathic painful sensations which had led him to undertake the inquiry. Since this is the chief subject under consideration, we shall briefly direct attention to the observations of Ludwig on the latter variety of pain.

Ludwig begins with the observation, that though in persons otherwise healthy violent corporeal efforts, especially when the spine is concerned, were suddenly followed by fixed pain in some part of that region, and generally in luxations or subluxations of the *vertebræ* or the ribs at their heads, the sufferers complain of pain more or less severe,—yet surgical examination satisfactorily shows that subluxations or violent stretching of these parts seldom take place, and that it was evidently impossible that true luxations, that is the displacement of a bone from its position, could be recognized.

Upon reflecting on the forms of pain observed to take place, according to the popular language of his countrymen, however, Ludwig came to the conclusion, that three sorts of idiopathic painful feelings taking place in the back might be distinguished;—the *first*, flatulent or windy stretchings; the *second*, various stretching pains in the ligamentous parts of the spine; and the *third*, stretching pains proceeding from stagnation of serous or partly bloody fluids in the muscular structure.

In the first variety of *Rhachialgia* Ludwig represents unusual pungent fixed pain to come on in some part of the spine, especially in the vicinity of the chest and loins, sometimes unexpectedly, sometimes after efforts not very violent, yet more frequently after great efforts of the whole body, and particularly wrenches of the back or spine,—and to shoot with the tension to the sides of the loins and chest. The organs of respiration are at the same time disordered, so that a deep inspiration is observed to be short and somewhat painful. Though generally in quiescence the pain ceases, especially if the patient chooses a proper position, it is excited upon motion, and sometimes it is uninterrupted with anxious respiration. When commencing in the loins and there fixed, it is frequently so aggravated that it extends to the whole spine, and soon after causes pain of the occipital region, or even the whole head.

It is natural to imagine, that if this pain have followed violent motions or a great effort, some violence must have been inflicted on the spine. But as a similar sensation often arises when the individual, with the belly excessively distended, agitates his frame extremely in riding or running against the wind, or checks perspiration thus excited, the pain is ascribed to the air too copiously received by the lungs, and to the sudden chilling.

Ludwig proceeds to observe on the pains fixed to some point of the spine, or thence ascending to the head, that though the flatulent tensions seem to be of the nature of symptomatic pains, like those of colic, yet, from examination, it appears more reasonable, on account of the closer connection of the nerves to the spine of the back, to refer them to the head of idiopathic pains.

Though in many circumstances of disease, as in extreme distension of the stomach and bowels with food and drink, or with air extricated from their fermentation, in ascites and sacculated dropsy, or large tumours of the mesentery and ovaries, and even in pregnancy, these changes take place without inducing any sense of pain in the back, chiefly in consequence of the slow and gradual manner in which the parts are distended,—yet in all these cases, and particularly in pregnancy, delicate persons are never wholly free from an uneasy sensation in the back. If we investigate these cases attentively, the pain is found to proceed not from general distension, but from a particular flatulent cause expanding some part of the bowel,—a circumstance proved by the fact, that the pain disappears upon the expulsion of the wind.

The hypothesis of Ludwig, however, does not require the distending force of air alone affecting the entire tube, in order to account for these spinal aches. Partial constrictions of the bowels affecting one or more short spaces of the canal, he regards as much more injurious. Though he allows that flatulent distension occasionally gives rise to spinal pains, yet it is chiefly when the belly is not swollen, but generally contracted, that spasms proceeding from partial irritation of the intestines come on ; because they intercept the air in some swelled part, the pressure of which at length causes further tension of the nerves, and aggravates the pains in the spine. In these varieties of tension he conceives the pathologist ought especially to consider the collateral or splanchnic nerve.

In excessive swelling of the stomach, and especially in distension and protrusion of the transverse arch of the colon by the great tension of the hypochondriac and epigastric regions, Ludwig argues that the respiration is rendered difficult, short, and anxious, the *œsophagus* drawn towards the *cardia* prevents the eructations from rising upwards, and, unless it gets vent downwards, the painful tension continues, and the splanchnic nerve is drawn towards the *crura* of the diaphragm, while the spinal pain supervenes.

In constriction of certain parts of the bowels again, with flatulent distension of other parts, in which the belly is not swelled, but contracted into partial tumours, Ludwig argues that not only are the mesenteric plexuses and the neighbouring spinal nerves disordered, but the splanchnic nerve is sympathetically affected, and the tension at the origins of the intercostal nerve is continued upwards to the neck and occipital region; and from this circumstance, the pain thus produced is much more intense than that which depends on interrupted respiration alone. Both pains may indeed be conjoined. But he maintains that in treatment they ought to be distinguished; since in the former, viz. that depending immediately on feculent matter and flatulence, evacuation is most indicated, whereas in the other, besides evacuation, antispasmodic remedies are necessary to relieve pain, and favour the action of the eccoprotica.

In hysterical and hypochondriacal cases, the pain produced by tension of the nerves of the spine is referable chiefly, he allows, to the pneumogastric nerve, as indicated by the sense of constriction referred to the *cardia* and *oesophagus*, and by farther sympathy to the *larynx*.

In all these sympathetic pains, Ludwig takes care to observe, that the pathologist is not to think of a mere mechanical tension of the nerve, which he admits in the connection of the splanchnic and its intercostal origin, but to some acrimonious principle seated in the nerves, and irritating especially their medullary fibres to such a degree, that at length these several inconveniences create a most complicated and universal spasmodic disease, in the removal of which the practitioner must look to the particular irritating cause.

The subsequent consideration of the subject of idiopathic spinal pains, depending on the state of the ligaments, and on serous or sanguine stagnation in the muscles of the spine, though interesting and instructive, we must defer, as less directly connected with the present subject. We shall merely observe, that in many instances it might be shown, that imperfect circulation in the vessels distributed through these muscles is mainly, if not entirely, to be ascribed to some morbid state of the posterior order of spinal nerves.

From the foregoing facts it clearly results, that Ludwig had observed instances of idiopathic pains in the spinal column, which he conceived to depend, not on direct inflammation of any of the component tissues of that part of the human frame, but on irritation applied to the ramified extremities of a class of nerves, which are connected in origin with the spinal marrow; that he had applied to these idiopathic pains a distinctive appellation, indicative of their seat and nature; and that he connected the occurrence of this irritation in the nerves and their spinal connections with disorder of the intestinal tube, and derangement of its functions. Though he does not expressly state the proposition, that these pains may proceed to termination in *paresis* or loss of motion, yet from the circumstance of his referring the disease which he characterizes as *morbus noster*, to the head of *Rhachialgia*, which is eventually a paralytic affection, it must be inferred that he was aware of this result. The main and essential point in the doctrine is, the knowledge of the anatomical connections and distribution of the nerve, to which Haller had previously applied the name of *Splanchnic*, and to which Ludwig himself applied the name of *Collateral*, its twofold or bifarious physiological relation,—on the one hand, with the intestinal tube and its appendages, and, on the other, with the spinal marrow, and the fact of the irritating causes being propagated in the pathological state from the one extremity to the other of this multiplied nervous chain; and of all these facts Ludwig was most fully aware.

4. We have seen that Ludwig had observed idiopathic pains of the spine, which he conceived were seated in the spinal marrow and its investments, and the occurrence of which he ascribed to irritation applied to the intestinal extremities of the splanchnic nerves, and thence propagated to their trunks and spinal extremities. A view of these pains very nearly similar was several years after taken by John Peter Frank, Professor of Special Therapeutics and Clinical Medicine in the University of Pavia. This pathologist, who appears to have been fully aware of the influence of the spinal marrow in the formation of various morbid states of the system, is disposed rather to invert the views given by Ludwig, and consider the morbid irritation as in many, if not all, instances first manifesting itself in the spinal marrow and its nervous effects.

These views were first communicated in an academical address delivered in 1791, to the *Rector Magnificus*, the Members of the Faculty, and the pupils of the Clinical School of Pavia, in which the author adduces several important facts, tending to illustrate the effects of morbid states of the spinal column and its contents.* As these views must be allowed by all candid observers to contain, next to those given by Ludwig, the rudiments of the doctrine of Spinal Irritation, it is requisite to give a short abstract of them.

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* De Vertebralis Columnae in Morbis Dignitate, Oratio Academica extat in J. P. Frank, Delectu Opusculorum Medicorum, &c. Vol. xi. Ticini, 1792.

Frank adopts, in imitation of Ludwig, from Astruc and Sauvages, whom he censures for using it improperly to denote the lead colic, the term *Rhachialgia* or Spine-ache, as proper to designate those painful states of the spinal marrow and its investments, which, without approaching to actual inflammation, may nevertheless give rise to much suffering, and very considerable derangement in the functions of motion and sensation. He then, after a short view of the structure and developement of the spinal column, adverts to its most important diseases, injuries, and deformities, and their effects upon the muscles, and proceeds to explain, with some minuteness, what he understands by *Rhachialgia* or Spine-ache in the following manner.

" Both the vertebral column and the contained *medulla* are extremely prone to receive the seeds of diseases; though the origin of many pains felt in this part is to be traced to *irritation* of the nerves, issuing by the bodies of the *vertebrae* to the *viscera* of the chest and belly. For these most numerous and most sensitive chords, mutually interwoven by many connections, being either the direct offspring of the spinal marrow, or united with it in origin, faithfully represent even the smallest disorders arising in these organs, and excite so closely the sympathy of the spine in these disorders, that it is difficult to discover the point first attacked. Shall I add, that ofttimes the nerves, irritated by saturnine poisons, or rheumatic acrimony in the alimentary canal, by their single action on the medullary substance of the spine, produce in the extremities palsy, the origin of which will be sought in vain in the *vertebrae.* By the small-pox contagion, in dangerous cases of the disease, the spine is rent with the most intense pains, which equally accompany sometimes miliary eruption and gastric diseases. I have elsewhere described a case of tetanus so violent ensuing in bilious and miliary fever, that it not only produced *cyphosis*, but also retracted the ribs on each side of the chest into deep pits. Two years ago I treated in the hospital of Pavia five patients, each of whom, in consequence of palsy and trembling of the legs, could not move a step without the greatest difficulty; and whose disease, however, appeared rather to have its origin in the abdomen than in any other part. Any obstacles opposed to the blood flowing in its usual course to the womb, or to the hemorrhoidal vessels, or abortion itself on the approach of parturition, produces sometimes intolerable pains in the loins. Yet all these symptoms are phenomena not pertaining to the spine itself, but depending on the consent between the *viscera* and it. Meanwhile, unfortunate experience has taught physicians, that not unfrequently the cause of acute pains in the spine is seated at one time in the irritated ligaments of the *vertebrae*, and at another within the vertebral cavity itself; and that patients may suffer spine-ach as well as headach."

"But in like manner, as the *cephalaea*, which we term idiopathic, depends on different changes in the head or brain, and not unfrequently disposes to other affections of a severe character; so also *Rhachialgia*, a term which I must restore to its primary signification, depends at one time on a large afflux of blood to the vertebral canal; at another on a peculiar confluence of blood to that part, or on spinal *plethora* from varicose fulness of the vessels; at a third on latent stimulating acrimony in this part of the frame; and occasionally on inflammation arising either in the spinal *periosteum* or in the *meninges*, or in the medullary pulp, or on other causes. If very great fulness and dilatation of the vessels of the brain induce not unfrequently passing giddiness, convulsions, apoplectic attacks, and effusion of blood itself, so often induce apoplexy,—what evils, pray, may not arise from similar affections of the *spinal marrow?* Here experience is silent. But reason suggests, and examination of the spinal chord in dead bodies ought to have taught what may happen in many. I have no doubt that the effects of respiration upon the spinal marrow are the same as upon the brain; that the vertebral veins and sinuses, (the rachidial veins of modern nomenclature,) equally undergo alternate distension and subsidence; and that in long efforts of the lungs, these vessels in the spinal cavity are distended and swelled by temporary *plethora* exactly in the same manner as the brain itself. Nor would I believe, that, under these circumstances, apoplexies are more frequently induced than palsies of half the body. Not rarely we predict, from the circumstance of long-continued pain in the cervical region in old persons, the occurrence of apoplexy; and in many instances *hemiplegia*, occurring without previous apoplectic symptoms, is regarded as proof of the accuracy of this prediction. In short, the same state of vessels which within the head induces apoplexy, would, if taking place within the spine, give rise to palsy."

From these reflections it results, that Frank evidently ascribed the uneasy and painful sensations in *rhachialgia* to *plethora* in the vessels of the spinal chord and its membranes, and to any causes by which this *plethora* or congestion was induced and maintained. Of these causes he appears to have regarded impediments to the return of the blood by the veins as the most powerful; and, as the knowledge of the natural arrangement of these vessels is indispensable to a just understanding of their morbid and anormal states, he expresses his regret, that no sufficiently accurate description of the sinuses and veins accompanying the spinal marrow was extant among anatomists. It will be remembered that the description of the rachidial veins by M. Breschet did not appear till 1819. He directs the attention of his audience, however, to the circumstance of each *vertebra* almost having a circular or annular sinus communicating with the longitudinal sinus, on each side of the spine, the large quantity of blood contained in these vessels, and the want of valves in the emergent veins, and argues, that, with the erect position assigned to the human race, these furnish no slight cause of impediment to the ascent of the blood in this division of the venous system,—particularly he adds, when, either in the cavities of the chest, *abdomen*, or *pelvis*, so many causes concur to compress the trunks into which these veins should pour their blood. Hence he argues, it cannot be matter of wonder that in suppression either of the menstrual or the hemorrhoidal discharge,—that in the last stage of pregnancy, or in long-continued constipation,—that in inflammation, *prolapsus*, retroversion, and scirrhus of the *uterus*, that in spasmodic colic, and from similar causes, there should arise at the lumbar region of the spine, not merely sympathetic pain, (*consensualis* ad spinam lumbalem dolor,) but true congestion of the vertebral sinuses and veins, stretching, excruciating pains of the spine, or both pain of the legs and *ischias*, lameness, and tremors of the lower extremities, convulsion, numbness and palsy, or both general and epileptic shocks of the body, and tetanus.

He next considers the effects of the large supply of blood which the arterial vessels convey into the spinal cavity, as a cause of vascular *plethora*, and which, he argues, is liable to augmented determination or undue impulse under certain concurrent circumstances of disease in the organs of the chest and belly. Lastly, he adverts to the occurrence of hydrorachitic effusion in the interior of the spine and the formation of hydatids in the spinal membranes as causes of the same phenomena; to extreme induration of the substance of the spinal marrow, as a cause of atrophy of that part, and consequent loss of motion in the extremities; and concludes by expressing his views that the *tabes dorsalis* of Hippocrates was the effect of induration and atrophy of the spinal chord.

We confess that it appears to us that the above reflections on the effects of impediments to the return of the venous blood from the rachidial veins possess very great importance; that these impediments often form a real cause of pains in the spine, especially in those cases of hysterical, chlorotic, and hypochondriacal disorders, in which the circulation of the capillaries generally, and that of the veins, especially the abdominal veins, is extremely feeble and languid; and that they are so much the more applicable, that the *remora* or obstruction and stagnation must be greatest in the lower dorsal and lumbar region of the spine, where the painful sensations are most generally felt by invalids. The truth of these remarks all who have studied the mechanism of the rachidial veins and blood-vessels must admit. The circumstance, however, of mere impediment to the return of the blood from these veins is probably inadequate to account for all cases of painful sensation in the spine.

From the quotations now given, it must be evident that Frank had formed a tolerably clear idea of certain states of the spinal chord, in which undue irritation either at the origins or at the extremities of the nerves takes place. It is indeed important to observe, that he admits two circumstances as occurring in the phenomena of the disease, to which he applies the name of *Rhachialgia*. The first of these is, that the ramified or distributed extremities of the splanchnic nerves, may be unduly irritated by morbid states of the organs to which they are distributed, and that this irritation may be propagated backwards or in a reflected direction to the trunks of the splanchnic nerves, and thence to their connections with the spinal chord. The second is, that, in consequence of any cause or causes which derange the circulation in the vessels of the spine, undue irritation may take place in the spinal marrow, and the origins of the spinal nerves, and that this irritation may be propagated from the trunks towards the extremities along the course of the splanchnic nerves, to the different viscera of the chest and belly.

5. Chronological order would now lead us to the work of Dr Bradley. But it may perhaps be more consistent with unity of method, to complete here what we have to say regarding the farther more comprehensive and elaborate views of the subject of *Rhachialgia*, given by Joseph Frank, the son of John Peter Frank, in his System of the Practice of Physic. These views may be justly regarded as the expansion and developement of those of John Peter Frank; and as they were published in the first edition of that work at Leipsic in 1819, at a period when it is evident the author had not seen the treatise of Dr Bradley, it is perhaps doing no injustice to the latter author to specify shortly the views of the German physician.

Joseph Frank defines *Rhachialgia* to be *pain, not unfrequently periodical, proceeding from the vertebral column, unaccompanied with febrile symptoms*. It may be seated in the neck, back, loins or *sacrum*, or in all these regions of the spine at the same time. In slight cases pain is the only indication of the evidence of the disease. In more formidable cases, however, the symptoms always assume the character of deranged or impaired motion and sensation, varying, as the cervical, dorsal, lumbar, or sacral regions is affected.

Rhachialgia of the neck may give rise to rigidity of the neck, or morbid inflexion of the head, ringing of the ears, impotence in males, loss of voice, torpor or involuntary motions of the arms or the ring-finger or the little finger, involuntary stretching of the limbs, yawning, irregular motions of the heart, with sense of constriction, and often peculiar weakness, as if a formidable disease or death were impending.

Dorsal *Rhachialgia* or the *Notalgia* of Delius and Swediaur, is attended with numerous multifarious symptoms, of which the principal are impeded, panting respiration, interrupted with deep sighs, feelings of constriction, excruciating pains of the hypochondriac regions, especially under the false ribs, constriction of the abdominal muscles, impediment to the motion of the person from one side to another, difficulty in sitting, rising, walking, unless with the body inclined forwards, slow belly, frequent efforts to empty the bladder, and often incontinence of urine, emaciation of the lower extremities, *anaesthesia* of the skin, and flaccidity of the *gastrocnemii* muscles.

Lumbar and sacral *Rhachialgia*. the former often distinguished by the epithet of Loin-ach or *Osphyalgia*, present, besides the phenomena in the motions and sensibility of the lower extremities, a sense of formication or the creeping of insects, cold electrical shocks, feebleness of the legs, difficulty in voiding the urine; obstinate constipation, and impotency in the sexual functions.

With regard to the nature and pathological character of *Rhachialgia*, Frank, neither father nor son, express a more distinct opinion than what has been already stated. From the remote causes, however, by which Joseph Frank represents it to be excited, it results that it must be a malady of a most multifarious and varied character. Thus, besides the rhachialgic pains from injury and perverse action of the muscles, and from spontaneous luxation of the *vertebræ*, arising from disease of these bones or their connections, he specifies inflammatory *Rhachialgia*, from accumulation of blood in the spine; rheumatic *Rhachialgia*, from affection of the ligaments, *periosteum*, and spinal meninges; gouty *Rhachialgia*, from gout affecting the *medulla* or the *vertebræ*; gastric *Rhachialgia*, or that depending on disorder of the stomach, with loads of viscid phlegm and flatulence distending the intestinal canal; rhachitic and strumous *Rhachialgia* or that connected with strumous disease of the *vertebræ*, amounting sometimes to incurvation anterior or posterior, or lateral curvature; scorbutic *Rhachialgia*, or that depending on the presence of scurvy; syphilitic *Rhachialgia*, from syphilitic or perhaps mercurial *caries* of the *vertebræ*; *Rhachialgia Plicosa* occurring in persons affected with *Plica Polonica;* and lastly, nervous *Rhachialgia* ascribed to excess in sexual indulgences, to *mania*, and, in a temporary form, to hysterical affections. *

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* Praxeos Medicae Universae Praeceptae, auctore Josepho Frank, Partis Secundae, Vol. iii. Edit. Secund. Taurini, 1822.

It may become a most just subject of inquiry to what extent all these manifold distinctions are well founded. It is manifest that several of them, as the *Rhachialgia* from spontaneous luxation of the *vertebræ*, the rhachitic or strumous, and the syphilitic, all agree in the same state of the *vertebræ*, however the remote exciting cause may differ. Is there any good reason to believe that the rheumatic, the gastric, and even the inflammatory or congestive materially differ; for it is clear that by the latter the author does not understand a pure inflammatory attack, but those congestive states which occur in consequence of the use of spirituous liquors, external heat, constipation, menstruation, hemorrhoids, pregnancy, and *amenorrhoea?* In what manner does the nervous *Rhachialgia* differ from the gastric and congestive? Is there not reason to believe, that in the nervous there is accumulation of blood in the capillary vessels and veins of the spine, from the general weakness and loss of tone which these vessels suffer after the operation of the alleged exciting causes. The remote causes operate nearly in the same way, and concur in producing the same state of the vessels of the spine and its contents.

In the treatment of this disease, Joseph Frank recommends chiefly local antiphlogistic and revellent means, viz. venesection in the traumatic form, and afterwards, and in all the others, local depletion by means of leeches, blisters, setons, and issues, eccoprotic cathartics, rest in the horizontal posture, cold applications in the inflammatory and traumatic form, the warm bath in the nervous, and tonics and the astringent tonics in all.

The foregoing sketch will enable our readers to appreciate both the originality and the accuracy of the observations of Dr Bradley, and also of those authors who have since his time treated of the subject of spinal irritation. It shows that Ludwig and Frank, at least, perhaps several other continental physicians, were aware that a disease might attack the spinal column, which, though accompanied with much pain and suffering, did not necessarily give rise to inflammation or its disorganizing consequences, and which was therefore to be distinguished from those forms of disease of the spine which terminated in the destruction of the *vertebræ*. Frank the elder appears to have been the first who applied to this disorder the characteristic epithet of *Irritation* as a slighter and less violent degree of vascular excitement than Inflammation.

6. It is time, however, now to proceed to the treatise of Dr Bradley.

We have seen that Hippocrates and Aretaeus among the ancients had noticed the peculiar murmuring noise often observed in the bowels of dyspeptic persons, and delicate females. The occurrence of similar murmuring sounds in the bowels of many dyspeptic, hysterical, and hypochondriacal persons, has been observed in modern times by John Fiens, Fabricius ab Acquapendente, Riolan, Sennert, and Rosinus Lentilius, a physician of Nordlingen, in the end of the 17th and beginning of the 18th century. Fabricius remarks its connection with the motions of respiration, and imputes it to air inclosed within the cavity of the *omentum*;—a fancy in which he is followed by Sennert and Riolan, who further regards it as a species of ventriloquism (εγγαστριμυθοι). Rosinus Lentilius, who compares it to the croaking of frogs (*coaxatio ranarum*), and has a long discussion upon the probable situation and cause of these sounds, which he conceives must be most likely to take place in the colon, admits that it is a common observation, that sounds like the croaking of frogs are heard in the *abdomen*, especially of those in whom digestion is tardy. ("Coaxationem quasi ranarum in ea regione percipi cum primis in eis qui sunt ad bradypepsiam dispositi, novum non est.")*

This symptom, to which he gives the name of *stridor abdominalis*, Dr Bradley begins with describing as constituting, in his mind, the prominent character of the incipient stage of Spinal Irritation. He represents it to be not confined exclusively to either sex, but to be most peculiar to young females, from the age of twelve to thirty years. The phenomenon is preceded or accompanied from the first by loathing of food, and dyspeptic symptoms, and soon induces chlorotic paleness, with some emaciation, and weariness and lassitude on any locomotive exertion; frequent headach, sometimes distressing, and pains in the loins and lower extremities, attended often with some degree of torpor, especially on walking or long standing.

The pulse at the beginning, and during the earlier stage of the disorder, does not vary much from the natural frequency, especially during the day, when it ranges from 70 to 80. In the evening, however, it may rise 10 or 15 beats higher in the minute, and continues to increase in frequency as the disorder advances, so as in the confirmed stage to be always more rapid than natural. Slight shiverings, or a sense of chilliness almost uninterrupted, may be very prevalent during the day, and in the evening and during the night these symptoms are succeeded by heat, without much sweating.

There is, however, rarely much thirst; sometimes there is none; but the tongue is covered with a whitish fur, inclining to yellow, and often dappled towards the root, especially in the morning. The urine, at this stage of the complaint, is rather high-coloured, but in some instances it differs little from the natural state, and rarely deposits any sediment. The bowels are constipated; but the feces present no unnatural appearance.

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* Rosini Lentilii Eteodromus Medico-Practicus, anni 1709. Stuttgardiae, 1711, Aug. p. 773.

The noise within the *abdomen* is not constant, and returns at uncertain intervals in the course of the day, and is uncertain in its duration. The period of its continuance seldom exceeds twenty minutes or half an hour; and always at this stage it is heard while the patient is in the erect posture; for on laying down it ceases almost instantly, and is inaudible while the person observes the horizontal posture.

The sound is a good deal under the influence of the full or empty state of the stomach. Dr Bradley remarks, that, after the patient has sat down to a meal, and taken a few mouthfuls, the sound may commence, and continue for some time, then become feeble, intermit, and at length cease entirely; but that, on the contrary, the reception of food more frequently abates the sound.

The further description ought to be given in the words of the author himself, in order to avoid misrepresentation.

"This noise, which is always under the government of respiration, is for the most part similar to the croaking of a frog, especially in inspiration; but on expiration somewhat less so, and conveying an idea as if the sound issued from water, and often before it ceases like the plaintive tone of a dying animal, which is well described from the following passage from the note above quoted, —' Dicitur et *τριζειν* et *τρυζειν*.'"

"At every act of inspiration, on laying the hand on the left umbilical region, about two inches or two inches and a half from the navel, in a transverse direction towards the spine of the ilium, a sensation is felt as if some liquid was forcibly spirted or dashed against the peritonæum; but on expiration, this is less perceptible. This curious verberation is not always confined to the above point of the abdomen, as it will often be found two and a half or three inches from the navel, in the direction of the spleen; and during its presence, the patient seldom complains either of pain in the part, or any on moderate pressure, or even from change of posture; but, provided the part be suddenly pushed by a moderate force, great pain is felt in the region of the stomach, insomuch as to cause fainting; a circumstance that more particularly happens when the pulsation approaches the stomach. A pain also is frequently perceived in one or both of the iliac regions, which, as the disorder advances, becomes more distressing, as will hereafter be more particularly noticed. (Cases 4, 5, 8, 9, and 10.) There is seldom either tumefaction or discoloration to be observed in these parts of the abdomen; but the hypogastrium is generally swollen when the disease has made some progress, especially in the evening and fore-part of the night; but in the morning, the enlargement has nearly or altogether vanished, leaving, in some cases, a degree of soreness in that region."

The assemblage of symptoms now mentioned, which are exactly the same as those observed in cases of *asthenia*, of obstinate hysterical *dyspepsia* and *hypochondriasis*, are what constitute the first or primary part of this disorder, or that in which the intestinal tube is chiefly and generally affected. According to the observation of Dr Bradley, these phenomena are followed sooner or later by painful sensations, referred in general to the lumbar *vertebrae*, and which denote the presence of a state, which, if not obviated by suitable measures, inevitably terminates in palsy of the lower extremities.

" On continuing the examination," says Dr Bradley, " from the point on the umbilical region already mentioned, along the spine of the *ilium* in a transverse direction towards the loins, seldom much pain or soreness to the touch is met with; except in a few instances when the seat of the irritation will be found a little above the most prominent part of the *ilium*; but on forcibly pressing with the fingers on each side of the spinous processes of the third or fourth lumbar *vertebrae* from above, considerable pain will generally be excited, in so much as occasionally to produce a degree of sickness, but seldom so great as to deter the patient from undergoing a second examination. The seat of this pain is confined to no particular dimensions of space. It is sometimes found in the fourth, but perhaps oftener between the third and fourth lumbar vertebrae."

Though at this stage of the disease, Dr Bradley allows that the symptoms of deranged intestinal digestion may advance for a considerable time without much effect on the general strength, or any change in the structure of the spine, yet, at length the health and general powers are seriously impaired, the complexion becomes sallow, the surface exsanguine, and the spirits low; and the spine gives way at the lumbar region, either with an anterior projection, or a lateral bend to the left side. In the latter case, after no long time it takes a further lateral or oblique direction, inclining forwards and sideways, and by pressing the anterior point of the *os ilium*, causes the anterior spinous process to project in the same direction, and giving the right hip the appearance of enlargement, by reason of the increase of the hollow between the *ilium* and vertebral column.

In proportion as the spine is distorted laterally, Dr Bradley represents that portion of the abdominal contents immediately attached to it to be carried along it, which causes the left *hypochondrium* and *hypogastrium* to appear more protuberant than the right, especially in the evening, when the distortion is greatest from the effect of the erect posture during the day.

If the spine continue to follow the lateral direction, its upper part may at length take a counter turn towards the right *scapula*, which, with the superior and subjacent ribs, are thrust outwards; and if the distortion at this point be considerable, the head and cervical *vertebrae* incline to the left or opposite side.

When the distortion advances directly forwards, and then re mains stationary, the mass of the *sacro-lumbalis* and *longissimus dorsi*, on each side of the lumbar *vertebræ*, are elevated above the spinous processes, forming between them a deep narrow furrow,—which is more obvious when two or more bones are displaced. And if, from this state, the distortion proceeds laterally to the left, the spinous processes are buried beneath the thick extensor muscles, so as scarcely to be felt, unless the spine is bent forward and to the left side. Dr Bradley states, that he has seen no case of *stridor abdominalis* in which the distortion was towards the right side.—(P. 163.)

The simple anterior distortion may be attended with lateral and anterior projection of the *ilia*, causing an equal and uniform depression on both sides, but greater than natural, and thereby changing the appearance of the hips. The contents of the hypogastric region are in this case projected forwards, causing enlargement of that region most conspicuous in the evening. In this case the two flexures, the posterior one at the middle dorsal region, and the anterior one at the cervical, give the spine, viewed laterally, a double sigmoid shape, unless when the whole dorsal region forms a single large circular bend, in which case the flexure of the spine assumes what may be distinguished as the single sigmoid flexure.

As the spinal distortion continues to proceed laterally, Dr Bradley states, that further symptoms of " organic derangement are often present." It is manifest that the author understands by this term rather derangement in the organs, than change of structure; for, as proofs of this derangement, he subjoins, regurgitation of food, or vomiting, with pain and constriction across the stomach, pain and irritation in the hypogastric region, with painful micturition and hypostatic urine,—and much feebleness in the locomotive muscles. At this period, also, may ensue various symptoms of deranged circulation in the different organs of the head, chest, and belly. Thus, pain in the head, side, or stomach, *vertigo*, *dyspnœa*, and cough, with *hæmoptysis* or *hæmatemesis*, and sometimes *diarrhœa*, alternating with night sweatings, may supervene, while the pulse is at the rate of 110 or 120. The tongue has a red, smooth, raw, glossy appearance, as if stripped of its epidermal covering, and the urine may be loaded with a muco-purulent sediment. In some instances *hæmoptoe* recurs frequently; and in one case *ascites* terminated the disorder. Most commonly, however, the disease terminates as others do in which the spinal column is affected, in debility, palsy, and slow but sure dissolution. In a few instances, Dr Bradley knew it terminate suddenly fatally, (*e.g.* the 12th case,)—and he infers from the case recorded by Mr Chevalier, that the immediate agent was extravasation within the vertebral *theca*.

In some parts of his description Dr Bradley does not express himself in a manner sufficiently explicit to remove all doubt or difficulty about some of the consequences and modes of termination of this disorder. For example, he represents "the pain in the left side either at the point where the verberation is felt, or in the iliac region to be," during the alternations of constipation and *diarrhœa*, "very afflicting and indicative of impending suppuration, or the actual formation of matter either externally or internally." Yet he does not specify the part, external or internal, in which this suppuration may take place; and the reader is left to conjecture whether it is in the *vertebræ*, within the spinal cavity, or in the intestines, or in the *pelvis*, or in the abdominal *parietes*.

On the most important part of the subject, however, the question as to the nature of the disease, and the relation of the two circumstances which Dr Bradley represents to constitute in this case one disease, we find some doubt and contradiction. It is perfectly clear, from the foregoing abstract of the description given by the author, that he looks upon the stridulous or croaking sound within the *abdomen* as a part and symptom of an affection which is to proceed to disease in the spine. He expresses his belief that "this insidious and most formidable disease will undoubtedly be considered spinal, though attended with some peculiarities not common to any other species; such as the noise already described, and which, though designated by a new name, may perhaps only be the pathognomonic symptom that usually characterizes this variety of spinal disease." It is in short the characteristic peculiarity of his view that he connects the two phenomena of *stridor abdominalis* and painful sensation in the spine proceeding to distortion, in the relation either of cause and effect, or joint effects resulting from one common cause. Yet he soon after seems to entertain a doubt whether this be a legitimate conclusion. For immediately after the remark now quoted, he adds, that notwithstanding that all "the cases in the appendix illustrative of this affection, associate this species of ventral noise with the disease of the spine, yet he entertains some doubts whether the former is always dependent on the latter under the limitations before stated; for in case 2d, where *stridor abdominalis* returned after a long interval, and was well marked, there was neither any constitutional irritation nor apparent affection of the spine. In a second case tolerably well marked and attended with *anorexia*, great languor, and some degree of febrile excitement for many months,—symptoms which were thought to portend either the presence or the approach of spinal disease,—yet this could never be detected; and the noise left the patient without the assistance of art, but not before a general amendment was observed."

The question then comes to be, are the stridulous affection of the *abdomen* and the painful sensation in the spine and its subsequent distortion accidentally associated or necessarily connected; and if necessarily connected, in what manner are they connected? Does the cause of the stridulous intestinal sound give rise to the spinal disorder, or is the spinal affection the cause of the intestinal derangement of which the stridulous malady is merely a symptom?

If we consider impartially all the instances in which the murmuring sounds described by the authors to whom we have referred, and others, occur in the abdomen, we shall probably see little reason to conclude, that it is necessarily connected with the spinal disorder. We have already seen that this murmuring sound is mentioned by Aretaeus, notwithstanding that Dr Bradley could not find any evidence of this; and that it is noticed by many modern authors, Fiens, Acquapendente, Riolan, Sennert, Rosinus Lentilius, and several others; and yet in all these cases it was unconnected with any symptom of spinal affection. But on this point it is quite superfluous to adduce the evidence of authors. Do we not daily observe this stridulous affection to be very frequent in females, and delicate males,—in all persons, in short, in whom the intestinal digestion is imperfect and the bowels are tardy? Yet in none of these is there any decided symptom of spinal distortion or spinal pain; and though in some there may be tenderness in some part of the course of the spine, this is by no means so frequent as to justify the inference, that the stridulous noise is a necessary adjunct of the tenderness. We have already seen what Dr Bradley says as to uniform dependence of the stridulous sound upon the affection of the spine; and that is sufficient to show that it is impossible to regard the abdominal disorder as the cause of the spinal malady.

On the question, as to the spinal disease being the cause of the abdominal *stridor*, perhaps it is impossible to speak with the same confidence. The symptom has been very generally observed to take place in dyspeptic persons, in hysterical females, in males with dyspeptic and hysterical or hypochondriacal symptoms, and in both sexes affected with the *asthenia* of Sauvages and Willan. By those by whom it has been observed, it has been very generally regarded as a part and symptom of these affections depending on imperfect digestion, or digestion accompanied with the extrication of air which is not expelled from the intestines. With this explanation, which is unquestionably vague and general, Dr Bradley is dissatisfied, and conceives that it is more rational, considering the circumstances in which he has observed the symptom, to regard it as the effect of the disorder of the spinal column and its contents.

After questioning the justice of the opinion which ascribes the croaking noise to wind and liquid feces pent up in consequence of a contracted passage, and stating his belief, consequently, that *stridor abdominalis* may be present without any symptoms of a contracted gut, and that the latter may exist without giving rise to the former, he adds the following observation.

"And as a proof of the close connection of cause and effect between the spine and stridulous noise within the *abdomen*, I have never seen the latter to exist, when tolerably well marked, for the last seven years, when the former was absent, or without its having previously existed, excepting in the case above alluded to; but the former sometimes exists when the latter is not present."

The latter admission shows that the spinal affection may take place without necessarily inducing the stridulous noise within the abdominal *viscera*, and, consequently, that it ought not to be regarded as a cause of that affection. The subsequent observations are in several etiological respects important; but in none more so than in the inference with which they are terminated.

This variation, alluding to the fact, that spinal distortion is not always productive of abdominal *stridor*, he afterwards refers to the circumstance of age and sex, combined perhaps with some other latent cause. Those most liable to the complaint are from the age of twelve to thirty years, and perhaps half this number are betwixt the age of eighteen and twenty-two. He states, that he has never met with a case above thirty years of age; but that he has seen several from this period of life to sixty or upwards presenting, not only disease, but distortion of the spine anteriorly, yet without the stridulous affection. From this circumstance, he deduces the inference already alluded to—that disease or distortion at a certain part of the loins does not always occasion the stridulous sound.

With regard to other causes, we find that Dr Bradley takes nearly the same views as Ludwig and the two Franks in tracing rhachialgic pains to improper management of the person in early life, especially the confinement to constrained attitudes, carrying loads too heavy for the muscular strength, sprains or injuries to the loins, and that convenient abstraction, a *constitutional bias to disease*, which, we presume, corresponds with the *strumous diathesis* of other physicians.

It appears, from the observation of Dr Bradley, to be a disease much more frequent among females than among males; and the author expressly states, that he has never seen more than four male subjects labouring under well-marked symptoms of the disorder. In two of these cases, at least, the disease appeared under the usual form of lumbar abscess and probable vertebral caries; and in the third, the prominent symptoms were those of pulmonary consumption. It might be imagined that this greater prevalence in the female sex might lead to the belief that the abdominal symptoms of the affection were to be regarded as an aggravated form of hysterical disorder. Dr Bradley, however, maintains that the *borborygmus* arising from *hysteria* and worms is an affection quite different from the abdominal *stridor* of spinal irritation, and is to be distinguished from it, in so far as the latter is always governed by the action of the *diaphragm*, and is rarely perceptible in the horizontal position; and he equally maintains that the sense of beating within the abdomen in *stridor abdominalis* is quite different from the abdominal pulsation mentioned by Haller, and which he seems not to be aware was particularly described by Albers * and Burns. †

On the exact pathological nature of this disease Dr Bradley does not appear to have formed any very definite or precise ideas; and from the arrangement of his several heads, it becomes no easy task to collect any precise notions. He acknowledges, indeed, the obscurity of the subject, and the difficulty of forming on it clear and precise notions, by reason of the want of morbid inspections. We have seen that he thinks the malady ought to be regarded as spinal; and we further collect from his observations that it consists of two stages, an inflammatory and a suppurative, (p. 19, p. 30.) Afterwards he speaks of idiopathic pains in the spine as distinguishable from symptomatic pains, (p. 60;) then he speaks of spinal disease without distortion, by which we should think he clearly refers to cases of *Rhachialgia*, as designated by Ludwig and John Peter and Joseph Frank;—did he not in the same and the subsequent chapter (xiii. and xiv. p. 81, note, 84 and 85 and 89,) distinctly characterize the disease as "depending on subacute or chronic inflammation" of the *vertebræ*, "unattended with any displacement of the bones." Afterwards he speaks of the *irritation* in the spine, (p. 80, p. 81, note,) and the *irritation* propagated to other parts, as the *abdomen* or its muscular coverings, the coverings of the *abdomen* in the epigastric and umbilical region, and near the anterior spinous process of the *ilium* on the left side. In another passage he applies to it the denomination of Spinal Derangement; and upon examining the history of the several illustrative cases, he occasionally speaks of subduing inflammation, of allaying irritation (105) and of abating general and local irritation (104.)

It is further evident, that Dr Bradley distinguishes spinal disease without distortion, from spinal disease with distortion or lateral displacement of the spine, as he terms it. In the former, there is very generally, with the symptoms already specified, more or less tenderness or pain, on one or both sides of the spinous processes, felt chiefly on pressure, or when the part is acted on from mechanical causes; and there are sympathetic pains, or slight erythematous redness, with exquisite soreness in various parts, but especially in the abdominal *parietes*, without displacement, but sometimes proceeding to great weakness in the muscles of the lower extremities, so that the gait is tottering and unsteady, forming an approach to the *paresis* of the ancients, or even *paraplegia*. In the case of lateral displacement of the spine, on the other hand, one or more of the *vertebræ*, generally the lower dorsal or upper lumbar, is thrown side-ways from the axis of the spine, which then begins to be distorted laterally in the upper dorsal region, and sometimes at the lower dorsal and lumbar region; so that the figure of the chest is changed, the organs of respiration and circulation become constrained in their action, giving rise to *dyspnœa*, cough, *syncope*, palpitation, and hemorrhage from the lungs; the functions of stomach and intestinal tube are enfeebled, impaired, and perverted; and the disease may proceed to *paraplegia*, and loss of power in the internal muscles, ending fatally either by pulmonary consumption, dilatation of the heart, (case 16th), or dropsical effusion, (p. 69). The latter symptom as well as *purpura*, which Dr Bradley has occasionally seen, we should be inclined rather to attribute to the constrained circulation and the diseased state of the heart, than to regard as a separate termination.

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* Edinburgh Medical and Surgical Journal, Vol. iii.

† Observations on some of the Diseases of the Heart, &c. by Allan Burns. Ed. 1809. P. 273.

We regard it as singularly unfortunate, that Dr Bradley had not, in the course of his inquiries into the nature of this affection, been acquainted with the views of Ludwig and Frank. From the facts communicated in the volume of Dr Bradley, we are disposed to think, that he has associated together, if not confounded, two, perhaps a greater number, of maladies incident to the human spine. This error perhaps he might have avoided, had his life been prolonged to enable him to mature, and extend, and rectify his own observations. But, had he been aware of the previous observations of Ludwig and Frank, he might have probably been enabled, by comparing the results of his own experience with that of the two German authors, to form more clear and exact conceptions on the nature of the peculiar spinal disease, which he wished to distinguish from all others,—to specify the organic textures in which it commenced,—and to determine, whether it were the same with, or different from, spinal diseases already described, or whether it constituted merely a primary stage of some of these formidable disorders.

A very important question, on which we have in the present volume little or no information, is, whether the *Rhachialgia*, as described by Ludwig and Frank, and the spinal disease meant by Dr Bradley, necessarily terminates in *caries* of the *vertebræ*, or inflammation and softening of the spinal marrow, and inflammation of the envelopes. From the few cases of the disease which we have observed, we should say, that it does not necessarily proceed to these extremities, but that, if neglected or overlooked, it may go on to such a consummation. It is clear that Ludwig did not always observe this mode of issue in the cases of *Rhachialgia*, from which he derived his knowledge; and if Joseph Frank has not scrupled to admit cases of vertebral *caries* among those of pure *Rhachialgia*, it is certain, that the very circumstance of the enumeration of the latter under the general head, is a clear proof that the circumstance of vertebral *caries* is not necessary to the disorder. From the observations of Dr Bradley we gather that sometimes it terminates in vertebral *caries*, sometimes not.

These observations lead very naturally to the question of the true cause of the sensation of pain or tenderness in the spine. Is it the effect of an irritating cause applied to the ramified extremities of the splanchnic nerves, and felt by sympathy at the opposite or central ends in the spinal marrow, as was believed by Ludwig; and what is the reason that it is felt in the latter situation, or rather in the soft parts on each side of external surface of the spinous processes? Or is it a state of congestion or accumulation in the rachidial veins, as was believed by Frank, causing irritation to the spinal marrow and its investments; and what are the causes why this accumulation takes place in one class of persons, and does not take place in all, since the causes to which he alludes belong as much to the race as to individuals? On these points we have no more specific information from Dr Bradley than the facts already adduced afford. It may be collected, nevertheless, both from the cases given by Dr Bradley, and from the phenomena of those which have been observed by ourselves, and which we conceive, from a variety of circumstances, may justly be referred to this head, that, in a proportion of cases, the disease consists in morbid sensibility of the nature of *neuralgia*, in the muscles and integuments of the spinal column; that in a certain proportion it consists in morbid sensibility of the spinous processes or their plates, and their investing *periosteum*; and that in some cases the painful sensation depends on some derangement in the circulation of the vessels within the vertebral canal.

To the first class of cases we would refer the whole of those instances of *Rhachialgia* in which the pain is aggravated by pressure, either over the spinous processes, or on each side of the spinal groove. This takes place chiefly in delicate females, in whom the digestive function is disordered, the bowels are slow and torpid, the cutaneous circulation and secretions are languid, and in whom the process of menstruation is either irregular, or accomplished with pain, or entirely suppressed, or who are chlorotic or labour under *leucorrhœa*; in males occupied in sedentary employments and exposed to much solicitude, with imperfect digestion, and a naturally tardy state of the gastro-enteric circulation and the alvine secretions.

To the second head we would refer all those instances of *Rhachialgia*, in which the pain is aggravated not only by pressure but by external heat, as that of a fire or the hot spunge, the long continuance of the erect position, either standing or sitting, and by mental solicitude, or causes which operate on the mind. In some instances this form of the disease appears to be the result of violence, which would, in ordinary constitutions, be followed by little or no uneasiness, and at the worst by temporary soreness only.

In the third variety of cases the pain is aggravated neither by external pressure nor by heat, but is nevertheless complained of as very frequent and enduring. It is not constant, but is liable to recur whenever the stomach and bowels are much deranged, when the skin is dry, and the urine loaded. This form of spinal irritation is liable to take place not only in young persons generally, but in infants and children. It is the cause, if long-continued, of the incurvated state of the thumb, fingers, and toes, which we have seen inextensibly inflected into the palms of the hands and the soles of the feet, and also is one cause of that frightful affection denominated the Crowing Inspiration. It is liable however, to attack adult though young females, and may become the cause of a considerable variety of painful affections, for instance irritable or neuralgic breast, violent and urgent cough, pain in the region of the heart, with palpitation simulating *pericarditis* or dilatation of the heart, neuralgic pain of the belly simulating *peritonitis*, pain in the hypogastric region simulating inflammation of the *uterus*, irritable *uterus*, and various anomalous painful sensations in various parts of the body. In this variety of cases, there is every reason to think that the spinal chord and its membranes are unduly excited and rendered irritable by the presence of a greater than natural quantity of blood, which does not move from the arteries into the veins, and from the venous capillaries into the venous trunks with proper velocity, and consequently by the presence of blood which has not been duly and sufficiently aerated aud arterialized. In some cases, nevertheless, there is little or no tenderness in the spine, and the disorder is evinced by pain in other organs.

There is still in this inquiry another point to which we adverted at the commencement of this article, and, in its course, when speaking of the hypothesis of Ludwig, and which merits perhaps a greater degree of attention, than it has yet received. This is the question whether the irritation of which the pain and tenderness are symptoms, arises primarily in the spinal marrow and the investments of the spine, as maintained by Frank and apparently by Dr Bradley, or commences in the ramified ends of the splanchnic nerves, and, by irritating them at one extremity, induces irritation in the opposite, as was imagined by Ludwig. On these questions almost no specific facts are furnished by Dr Bradley beyond those already noticed, which it must be acknowledged are vague and rather unsatisfactory. There is nevertheless evidence of one kind, which would lead to the inference, that the latter is the most natural and the most frequent mode in which the disease is commenced. We allude to that derived from the kind of subjects in whom the disease generally occurs, and to the class of agents under which its symptoms are commonly most alleviated.

In the individuals in whom the symptoms of *Rhachialgia* take place, it is invariably found that, previous to their appearance, and along with them, the bowels have been long slow, inactive and torpid, the motions of the alimentary canal generally have been inert and languid, and the circulation of the two great surfaces, the mucous and cutaneous, has been inert and imperfect, and their secretions consequently scanty and irregular. This state of the alimentary function is often still more strikingly conspicuous in the spinal irritation of infants and children, in whom the bowels are slow or alternately unnaturally loose and bound, the motions unhealthy and slimy, and the belly painful and tumid at the commencement of the disease and during most of its course. In the case of the latter class of individuals, and also in that of young or adult but delicate females, the developement of the rhachialgic symptoms seems to depend chiefly on the great and easy excitability of the nervous system at that period of life and in that sex, and the extreme facility with which the different divisions of the nervous system are acted on by irritants generally, and by those applied to the intestinal organs in particular.

In speaking of this subject, however, it is important to observe, that the occurrence of Spinal Irritation in the manner now mentioned, is particularly facilitated by the anatomical connection of the blood-vessels and nerves of the chylopoietic organs. It may be regarded as a physiologico-pathological principle, established by the concurrent evidence of many facts, that any derangement in the villous surface of the alimentary canal, or in any of the chylopoietic organs, must be attended with very considerable changes in the circulation of the vessels distributed to these organs. It is of little moment whether this change in the circulation of the gastro-enteric blood-vessels be regarded as the effect or the cause of the deranged function of the organs. If it be induced, which can scarcely be questioned, it cannot fail to act on the splanchnic nerves. The blood of the mesenteric and mesocolic branches cannot circulate into their capillaries and into the corresponding veins; but moves slowly or stagnates in the arterial capillaries, and afterwards in the branches and trunks, which thereby become inordinately distended. This distension, however, operates not only on the tissue of these arteries, but also on the nerves by which they are surrounded.

An important anatomical fact is, that all the blood-vessels distributed to the chylopoietic *viscera* are inclosed and closely surrounded by nervous filaments, which in their final distribution accompany these arteries, and seem to be appropriated to them, rather than to the proper tissue of the organs themselves. Thus the coeliac artery is surrounded by the filaments of the solar plexus; and from this are distributed numerous nerves, accompanying and often surrounding the different branches of that artery. The superior mesenteric plexus, deriving its filaments from all the coeliac ganglions, as soon as it emerges from the coeliac plexus, extends its filaments over and around the superior mesenteric artery and its ramifications. The inferior mesenteric plexus, denominated also the mesocolic or the middle mesenteric plexus, consisting of accessary twigs from the lumbar ganglions of the great sympathetic, with filaments from the coeliac and superior mesenteric plexus, encircles with its filaments, almost like a net-work, the branches and twigs of the inferior mesenteric artery, sinking with these vessels into the left arch of the *colon* and the *rectum*, and communicating with the hypogastric plexus. The filaments of the latter plexus are in like manner distributed to the lumbar artery, the lower end of the *aorta*, the iliac artery, the femoral artery, the hypogastric artery, and the vessels sent to the lower part of the sigmoid flexure of the colon, and to those of the *rectum*, *uterus*, *vagina*, ureters and bladder.

It is indeed a most important anatomical fact in the explanation both of the healthy functions and of the morbid action of the splanchnic nerves, that not only these, but all the branches of the great sympathetic, whether in the head, the neck, the chest, the belly, or the *pelvis*, are distributed chiefly to arteries, and surround their branches, with close and almost inseparable net-works of filaments. This arrangement, originally described as to the fifth pair and certain divisions of the intercostal nerve by Wrisberg, * and confirmed as to the nerves of the heart by Andersch, † Neubauer, ‡ Behrends, § and Scarpa, || was clear-

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* Henr. Aug. Wrisberg, Observationes Anatomico-Physiologicæ de Nervis Arterias Venasque comitantibus, apud Ludwig Script. Neurolog. Tom. iii. Art. ii. p. 24.

† Fragmentum Descriptionis Nervorum Cardiacorum, &c. a S. Th. Soemmering, apud Ludwig, Tom ii. Art. ii p. 113.

‡ Neubauer, Opera Anatomica.

§ J. Bernh. Jac. Behrends Dissertatio qua Demonstratio Cor. carere Nervis, additaque Disquisitione de Nervorum arterias cingentium. Moguntiæ, 1792.

|| Tabulæ Neurologicæ ad historiam anatomicam Nervorum Cardiacorum, &c. Ticini, 1794.

ly proved by Walter[*] as to the branches, twigs, and filaments of the splanchnic nerves, and may be easily demonstrated, with ordinary care, to the satisfaction of any one accustomed to trace nervous filaments. It is further a very important feature in this arrangement, which deserves special attention, that the nervous filaments are distributed to the arteries specified in the inverse ratio of their size, and that the filaments of the splanchnic nerves are distributed less numerously to trunks than to branches, and less numerously to branches and to twigs than to minute arteries.

Though it be difficult to resist the inference, that in all probability one of the principal objects of this arrangement is for the nervous filaments to regulate in some manner the action of the arteries, the circulation of the blood, especially in their minute vessels, and the consequent nutrition and secretions of the organs,—it is nevertheless not less difficult to resist the counter part of this conclusion, viz. that the circulation in the arteries must influence the sensitive and other functions of the nerves; that, in other words, if there be an influence of the nerves over the arteries, there must be a reaction of the arteries upon the nervous filaments, and consequently upon their trunks and roots. These states, therefore, of the branches and twigs of the coeliac artery, but above all of the branches and twigs of the superior and inferior mesenteric arteries, we think must be regarded as very important and powerful agents in the production of irritation in the splanchnic nerves and their spinal connections.

We intended to have added some observations illustrative of the evidence derived from the *juvantia* and the *laedentia.* We have already, however, exceeded the limits assigned to this subject; and we have merely to add, that, however requisite in the treatment, be the use of those agents which are conceived to operate on the spine, its vessels, or its contents and their vessels, the employment of those remedies which operate on the intestinal tube, and tend to rectify and adjust its actions, are always of the utmost service, and can never be dispensed with, in the alleviation or removal of the multifarious symptoms of this disease.

We have now to return to the Treatise of Dr Bradley, to advert to the method of treatment which he recommends as calculated to accomplish a cure, and subdue the symptoms of Spinal Irritation.

We have seen that Dr Bradley makes a twofold division of his semeiography, one being devoted to the stridulous affection of the bowels, and the other to the morbid sensibility of the spinal column. Of this twofold division his therapeutic measures and instructions in some degree partake, with the exception that, as he here clearly considers the abdominal *stridor* as dependent on the affection of the spine, he directs his primary therapeutic measures to the removal of the mischief in the latter region of the body.

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[*] Joan. Gottl. Walter, Tabulae Nervorum Thoracis et Abdominis. Berolini, 1783.

With the view of alleviating uneasiness and pain in the back, and opposing the advance of spinal distortion, Dr Bradley recommends, in the *first* place, rest in the horizontal position, in order to relieve the feeble and yielding spine of the disproportionate load which it is required in the erect position to sustain. In the *second* place, with the view of abating local inflammation, he recommends the detraction of blood by cupping or leeches, but especially the revulsion produced by caustics, issues, and blisters. Of the merits of the two latter remedies he expresses himself in terms rather inconsistent. He, in the *first* place, strongly recommends caustic issues as a great means of abating chronic inflammation, preventing distortion, and diminishing the intensity of the febrile symptoms. Afterwards he expresses his conviction, that "the frequent application of a blister will be attended with equal, if not superior advantages; as it produces *a priori* more clearly a double effect, not only by affording a discharge from the part, but, by every new excitement of pain, giving a great stimulus to the nervous system." This, we confess, we do not understand. Granting the fact that the blister were a stimulus to the nerves, we should be glad to learn how a stimulus can be useful to parts which the author allows are already overstimulated.

We believe that the old principles of revulsion and derivation, which by the neologists of modern times have been clothed in the garb of counter-irritation, afford the true explanation of the therapeutic effect of blisters and issues. A blister or an issue applied to the skin excites in that tissue and its subjacent one an artificial morbid action above and beyond their natural properties; and by so doing may lessen and finally extinguish the morbid action in the deeper seated textures.

In addition to these remedies, which are understood to be employed with the view of abating and removing the local irritation chiefly, Dr Bradley recommends, in order to allay febrile heat and its attendant symptoms, without debilitating, "some cooling sedative or alterant febrifuge," as the citrate of potass, with occasional doses of sulphate of magnesia, combined with a bland milk diet. These remedies are exhibited so long as the tongue is furred, the skin dry and hot, and the appetite feeble. When the tongue has become clean, and not before this, he allows such tonic remedies as the muriate of lime or sulphate of iron, either alone or with calumbo; and the diet is amended by some allowance of animal food.

It is remarkable, that though he allows, that in these affections the bowels are much constipated, yet he is adverse to the employment of purgatives, which he recommends to be administered with a sparing hand; for the reason, that the constipation is accompanied with a want of appetite, and both are dependent on atony in the first passages, or in some visceral derangement in consequence of distortion; and therefore "an excess of alvine evacuation will debilitate without increasing the appetite." "All the means" he adds, "for removing the torpor in the first passages, or for stimulating the hepatic or chylopoietic *viscera*, will often be unavailing, at least till the mechanical part of the cause be removed."

The objections to which the author here alludes are applicable, we conceive, to the abuse, not the use, and to the unseasonable, not the timely and judicious, employment of purgatives. There is, we can assert from experience and sufficient trial of this class of remedies in the affections of the intestinal tube, whether connected with impaired nervous energy or not, no class of agents more useful, if they be employed so as to insure an eccoprotic effect. It is astonishing what quantities of feculent matter and morbid secretions may be discharged in these cases; and until they are discharged no amendment appears. The intestinal tube is in the state of the overdistended bladder. As the latter requires the periodical introduction of the catheter, to prevent overdistension, so the lower part at least of the intestinal canal requires frequent evacuation, to enable it to recover its contractile energy; and if it be deemed unsafe to attempt this by cathartic medicines, the employment of clysters is at all events indispensable.

Under the use of the remedies now specified, Dr Bradley states, that the croaking noise either ceases or is greatly moderated; the tongue becomes cleaner, the appetite improves, and the uneasy sensations at the stomach are abated; and the bowels in a short time become less inert. The pain in the loins, he observes, abates as that from the caustic issues begins to be felt; and if the disease be not too far advanced, recovery will be effected. The period for accomplishing this varies from two to six, or even twelve or eighteen months, according to the stage of the disease at which treatment is commenced, and according to the age, habit, and state of the organs of the patient.

This method of treatment, however, is applicable principally, if not exclusively, to cases in which the irritation has not yet advanced to deformity, dependent on decided distortion of the spine. In the latter case, not only does Dr Bradley recommend a more decided and energetic use of caustic issues and setons, with the horizontal position, but he insists on the patient adopting the use of well-adapted mechanical means, among which he specifies as the best, Eagland's stays. This apparatus, which was contrived and manufactured by a Mr Eagland of Leeds, consists of a support for the whole body, and is so constructed as to pass under the heels, and upwards externally along each extremity, resting under the arms, and leaving the individual at complete liberty to move the head and all the joints, (see p. 73.) The stays made by Mr Jones he recommends in posterior projection, that is, we presume, from anterior incurvation.

On this subject we feel it requisite to observe, that, notwithstanding the high authorities by whom the use of these mechanical contrivances is recommended, and the evident attention devoted by the author of this volume to the subject of spinal deformity, we doubt the propriety of the use of any means of the kind, and are very much disposed, not only to question the validity of the statement, that they are beneficial, but to express the apprehension, that they are oftener detrimental in a very large proportion of cases. Two reasons occur to us as very great, if not insurmountable, objections to the use of these mechanical contrivances. In the *first* place, a person already enfeebled so much by an incipient but advancing disease, that the muscles are inadequate to sustain the weight of the head and trunk, is not likely to be able to sustain an additional weight imposed upon it by the apparatus; and when we consider how much more the muscles are thus compelled to move in every change of attitude and position, the addition of the apparatus cannot be supposed with any show of reason to facilitate these motions. In the *second* place, every mechanical contrivance in the shape of stays, collars, and similar means, which not only press, but more or less confine various parts of the body, must inevitably induce more or less atrophy of the muscles,—*first*, by compressing some of them, and restraining their motions, and, *secondly*, by performing in certain attitudes and positions what the muscles were intended to do. In persons who have worn such contrivances the muscles are very small, pale, and flabby; and in the parts most compressed they are often extremely shrunk, and their fibrous structure almost obliterated.

In short, excepting the use of the horizontal position upon a firm resisting mattress, with an elevated elastic cushion in the lumbar and cervical region to support the spine at its natural hollows, it is impossible for us to imagine any mechanical contrivance, either useful or safe, in the treatment of spinal affections.

The foregoing account of the work of Dr Bradley, with the remarks interspersed and subjoined, we have submitted to the readers of this Journal, with the view not only of supplying a deficiency in the literary history of spinal disorders, and directing the attention of English readers to the doctrines of two eminent foreigners, but of rendering a merited though tardy act of justice to a deserving practitioner. We are aware that the author is now beyond the reach of either human praise or censure, and can no longer take interest either in the approval or disapproval of the doctrines which he taught. But this consideration has only induced us in the foregoing remarks, to direct attention more to the merits than the defects of his performance; more to the originality of his views than to their incidental errors. If spinal irritation is to be viewed as a particular disease, Dr Bradley must be regarded as the first English author on the subject. DAVID CRAIGIE.

ART. II.—*Report from the Select Committee of the House of Commons on Medical Education, with the Minutes of Evidence, and an Appendix.—Part II. Royal College of Surgeons of London.*

HAVING finished our analysis of the Report on Medical Education which relates to the Royal College of Physicians of London, we shall now proceed to the consideration of that which concerns the Royal College of Surgeons. We shall previously, however, give a general account of the formation and constitution of that body, as we did with the College of Physicians.

In the third year of the reign of Henry VIII., an Act of Parliament was made "for the appointing of Physicians and Surgeons," by which it was enacted, that no one should be allowed to practise as a physician or surgeon, either in London or the country, without undergoing, if in London, or within seven miles of it, an examination by the Bishop of London, or Dean of St Paul's, and a certain number of Doctors of Physic, or persons expert in surgery; or, if in the country, by the bishop of the diocese or his vicar-general, and "such expert persons in the said faculties as their discretion shall think convenient."

The charter of the College of Physicians, and the legislative enactment by which it was confirmed, took away the powers of the above Act, so far as physicians were concerned; but in 1540, an Act was passed, by which an union was established between the barbers and the surgeons of London, who, before that time, existed as two distinct companies, both of them "occupying and exercising the said science and faculty of surgery." By the terms of this union, the respective parties, under the designation of the "Mystery and Commonalty of Barbers and Surgeons of London," were precluded from interfering with each other's province, except as to drawing teeth, which the barbers were permitted to do; and this state of things remained till the year 1745, when an act was passed for making the surgeons and barbers two distinct corporations. It may here, however, be remarked, that though the union of one of the meanest occupations of society, according to our present conceptions of things, with one of the most respectable, appears to be not a little incongruous and inappropriate, yet it secured a complete separation of offices; and in time led to the establishment of a distinct Incorporation for surgeons, but without that interference with their province, which existed when surgery was equally open both to barbers and surgeons.

The Surgeons' Company existed till the year 1796, when, from an informality in the annual election, (two of the three persons who formed the masters and governors not being present) the Incorporation became liable to be dissolved. An attempt to get a fresh act of Parliament, which was made in the year 1797, failed, and it was not till the year 1800, that the present charter was obtained. The provisions of this charter erected the members of the old corporation into a Royal College; and created for life, a *Court of Assistants* of twenty-one, who were invested with the power of electing from their own body, and for life, a *Court of Examiners*, consisting of ten members; of choosing annually from such court of examiners a *Master and two Governors;* and of making bye-laws for the regulation of the general concerns of the College. It is by this charter that the College of Surgeons is still governed, but with a few modifications which were made in it by his late Majesty in 1822. By this supplementary charter, the master is designated *President*, the two governors *Vice-Presidents*, and the Court of Assistants, the *Council* of the College. The King's Sergeant-Surgeon, and Surgeon-General, too, who, by the charter of 1800, came as a matter of right into the Court of Assistants on the first vacancies, can now only enter the council by election; but when once admitted into the council, they succeed, as a matter of course, to the first vacancies in the Court of Examiners. The other members of this court are now elected by seniority from the council. By the bye-laws of the College, no practitioner in pharmacy or midwifery is eligible on the council; and when any vacancy occurs in that body, it is filled up, by ballot, by the remaining members of the council; a ballot being first taken on the senior resident member of the College, not of the council, and not practising pharmacy or midwifery, provided he is proposed by any member of the council. But should such person be passed over and not ballotted for, or if ballotted for, be rejected, his name is never again brought forward.

Having given this general account of the constitution of the Royal College of Surgeons, we shall proceed to the examination of Mr Guthrie, the President of that body, who is Deputy-Inspector General in the Army, and Surgeon to the Westminster and the Ophthalmic Hospitals. He gives the same general account which we have already done of the constitution of the body over which he presides; and states, that its members consist of about 8000, who are dispersed over various parts of the world. He informs the Committee, that many different modes have suggested themselves of filling up vacancies in the governing body, but without the College being satisfied as to the propriety of any change. If the electors were made to include all the gentlemen who practise surgery alone in London, amounting to about 150, these, he thinks, would form a sort of aristocratic body, who would be viewed with dissatisfaction and jealousy by the members at large. Canvassing would be necessary; seniority would be little attended to; and the election, according to Mr Guthrie's opinion, would be conducted "less justly for all parties, and less advantageously for the public service than at present." At the same time, he thinks, that the great body of the members would be less satisfied than they are with the present plan of proceeding. With regard to investing the right of election in the whole of the members, who in London may amount to 2000, he considers that this would make surgeons a "canvassing," "placarding," and "quarrelsome body," instead of being a "peaceful, quiet, and scientific" one; would occasion them to be always at "dagger's draw," and would interfere with the harmonious and efficient practice of the profession; while it would give to the youngest surgeons of St Thomas', Guy's, or St Bartholomew's Hospitals, (who probably would have educated nine in ten of the parties who would vote) a great advantage over the ablest men at the west end of the town.

Mr Guthrie considers that the bye-law which precludes practitioners in pharmacy from being eligible for election into the council is a very salutary one; for the nature of their practice, which occupies their whole time and attention, does not admit of that constant and unremitting attention to anatomy and surgery which is necessary to qualify them as surgeons. "These gentlemen do not themselves," says he, "claim to be surgeons of the highest order; they do not generally addict themselves to those studies;" nor can they be hospital surgeons in London. But if pharmacy is given up, and a person devotes himself two or three years to surgery only, there is then no objection to his coming upon the council. The late Sir David Dundas was, however, mentioned by the Committee as having been a member of the council of the College, though a practitioner in pharmacy; but Mr Guthrie states, that Sir David was not admitted into the council while he continued an apothecary, though he was his Majesty's Serjeant-Surgeon, and therefore entitled by the bye-laws to this distinction; and that it was not till some years afterwards, when the charter was granted, and he had ceased to be an apothecary, that he was allowed to take his proper rank in the College. It appears, however, from evidence which Dr Yellowly afterwards gives on the subject, as well from his own knowledge as from the information of Sir William Dundas, Sir David's eldest son and successor in his title, that Sir David thought himself aggrieved by not being admitted into the council under the old bye-law; but that, as there was a difference of opinion among his counsel as to his claims for a mandamus to compel his admission (three being for it and three against it,) he did not apply for one; that his cause was taken up, unsolicited, by Lord Thurlow, and his name accordingly inserted in the new charter of the College as one of the council, and to succeed to the Court of Examiners on the first vacancy; and that Sir David continued in the practice of pharmacy for many years after he was thus appointed a member of the council.

"Branch practitioners" are not admitted on the council; yet the late Mr Ware was a member of it, who, it is well known, confined himself exclusively to the diseases of the eye, as his son now does. Mr Ware was certainly, therefore, not to be regarded, according to the information of Mr Guthrie, as practising general surgery like Mr Lawrence, Mr Travers, and himself.

Mr Guthrie is of opinion, that the same reasons apply against a person being admitted into the council who practises midwifery as pharmacy, namely, the want of sufficient opportunity of attending to anatomy and surgery. Dr William Hunter, though a great anatomist, was, he says, no surgeon; and he thinks, that it is not proficiency in any one detached branch, operation, or department, that suffices to make a surgeon, but a general acquaintance with all. Notwithstanding, however, he deems it impossible to extend, with safety, admission into the council, he states, that the duty of election is so "painful and disagreeable," that the council would be "delighted" if the Committee could point out any way of getting rid of it, with equal advantage to the public and the profession; and that, though the elective privilege could not with propriety be given to all, yet that the body at large might have a compensation, in being allowed to attend all the College meetings, except those for election into the council, which is a concession that he thinks would be received with much greater pleasure than the right of election. He also thinks, that when a person has once been passed over, there should be a power of resuming, at some future time, the consideration of his election; and that he should not be passed over without having the power of appeal to the Secretary of State for the Home Department, whose confirmation, he is also of opinion, should be necessary to the validity of an election.

Mr Guthrie was questioned much about the education necessary for admission into the College of Surgeons; and it appears from his information, and from the documents given in the appendix, that, for a considerable time, a candidate was required to have passed at least five years in the acquisition of professional knowledge, which is now increased to six; but it is to be observed, that not less than four years and a-half of this period may be spent in an apothecary's shop, where, it is well known, that,—with few exceptions, and those applying to the metropolis and a few large provincial towns, where there may be hospitals and medical schools, and the pupil may be allowed to attend them,—the opportunities of obtaining a knowledge of even the rudiments of medical science are very limited and imperfect.

Attendance on anatomical, surgical, and other lectures, for two seasons, extending from October to April inclusive, and on hospital practice for a year of this period, are necessary to enable a student to apply for his diploma as a member of the College. The qualification for such application, therefore, may be obtained in rather more than a year and half; that is, in the period extending between October of one year and May of the next year but one. Mr Lawrence stated the period of attendance in 1826 to have comprised only sixteen months, and contrasted the greater duration of studies required by the College of Surgeons of Edinburgh, compared with that of London, in a manner which appeared to Mr Guthrie to be so very incorrect, as to be a principal means of inducing him to give that gentleman a black ball, when it came to his turn to be elected a member of the Council. We cannot, however, discover the "great mistatement" of facts complained of by Mr Guthrie, as contained in Mr Lawrence's tabular view of the education required in 1826 at both Colleges. Mr Lawrence, it is true, *might* have spoken of *months* of study in Edinburgh as well as in London, if it had been absolutely necessary to bring the estimates to the same denomination; and he would, indeed, have been more correct, if he had mentioned the studies of Edinburgh as extending to three sessions, instead of three *years*; but it is clear that there was no intention to deceive or mislead on this subject, from its being stated in the course of the Table, that the lectures prescribed were to occupy three winter sessions, from *October to April inclusive*, which evidently means six consecutive winter months during three separate years. The period required is, therefore, two years and a-half; or, to speak in months, according to Mr Guthrie's wish, thirty months; which is nearly double the period necessary to qualify for the College diploma in London when Mr Lawrence wrote. The attendance is now, however, as we have stated above, increased to rather more than a year and half; but it is still less, by one session, than the time required at Edinburgh. Mr Guthrie likewise blames Mr Lawrence for not taking into consideration the schedule of the Apothecary's Company in the account which he gives of the studies necessary for forming a member of the Royal College of Surgeons; but we think his reasoning on this subject is wanting in fairness and candour, inasmuch as every member of the College is not necessarily an apothecary, and therefore obliged to conform to the regulations of the Apothecaries' Company. It is, indeed, very true, that the education and endowments of the principal surgeons of London are generally of a very liberal kind; and that they are not usually limited, even to the united courses required by the College of Surgeons and the Company of Apothecaries for their respective students; but still the minimum of education laid down was a legitimate subject of remark; and that the College thought so, is obvious from their having, in the year 1831, introduced *medical* lectures into the studies necessary for the qualifications of their members.

Mr Guthrie states that the students who are articled or apprenticed to members of the College, before the Court of Examiners are examined in Cicero *de Officiis*, and that, as they are not articled till they are seventeen, there is thus sufficient time allowed for preliminary education, in which they are generally found to be very well prepared.

He enters into some very long details on the subject of the education and qualifications of druggists and general practitioners. An apprenticeship to a druggist, though there may have been a very imperfect previous education, goes for a part of the six years required by the College to be employed in the acquisition of professional knowledge; but there are no qualifications necessary for the druggist; and Mr Guthrie thinks he ought to undergo an examination, if in London, by the Apothecaries' Company, and if in the country, by the physicians and surgeons of country hospitals, in the presence of the treasurer.

No apprentice should, he is of opinion, be allowed to be taken by a general practitioner, until he shall have been examined by the rector of his parish, or the clergyman of the persuasion to which he may belong, in English, common arithmetic, and Latin. And in order to prevent frauds, (which he states are not unfrequent,) the indenture should be signed before a magistrate or other duly authorized person, and registered at the College of the country where he resides. Mr Guthrie deems it also expedient, that apprenticeships should never commence till the parties were seventeen; by which means there would be always an adequate time given for preliminary education.

The general practitioner should, Mr Guthrie thinks, be required to evince his competency in midwifery, and the College of Surgeons were desirous of instituting an examination on that branch, by the assistance of men of eminence in the art; but they found that this would exceed the powers conferred by their charter. He deems it proper that the College should have the power of preventing persons practising surgery without authority, and of punishing irregularities in practice; and that the double qualification now in use for the general practitioner should be continued. Quacks, he thinks, cannot be prevented; but their commodities ought to be taxed very largely, as a sort of protection to the regular practitioner. On a subsequent day, however, Mr Guthrie does away with this opinion by saying, that it is not his own, but that of "the gentlemen who wish for some protection of this kind;" and that for himself, he thinks it does not "signify a straw," whether there is such a duty or not. Attendance, and not medicines, should be paid for, and the charge made for this, must depend, he thinks, on the capabilities, wishes, and arrangements of the different individuals, and cannot be fixed by any law.

Mr Guthrie is of opinion, that the public hospitals, as professional schools, should be put under the regulation of the College of Surgeons. They require, he thinks, much legislative attention, for it is not every hospital calling itself so that ought to be recognized as a fit place of education. Some documents relative to discussions on this point are given at length; but we think he takes by much too isolated and contracted a view of the subject, when he would exclude physicians from having any thing to do with the management of hospitals as professional schools, though they are so intimately connected with the education and practice of nine-tenths, or perhaps a still greater proportion of those who attend public hospitals.

Mr Guthrie approves much of the Anatomy Act; and thinks it a great advantage, that its operations are very much under the control of the Home Secretary, who could arrange many professional matters very readily and satisfactorily, if they were left to him.

A teacher should be allowed to certify only for two branches, or rather, as Mr Guthrie thinks, for one only; for it has been the very improper habit of some to lecture on 3, 4, or 5 subjects, all which they cannot teach effectually. Mr Guthrie enters into much detail on the mode of conducting the College examinations. One examiner principally examines; but it is in the presence of the whole; and any one is at liberty to ask what questions he pleases. The expence of the diploma is L. 22, and the emolument of each of the ten examiners about L. 300 per annum; there being from 40 to 50 meetings in the year, and

10 being the utmost number which can be examined on one night. The time occupied in the examinations is generally from half-past five in the evening, till one o'clock, or even later, in the morning. The remuneration may appear considerable; but it is much less, Mr Guthrie observes, than is given by Insurance Companies, who pay L. 150 per annum for one hour in the week; and the business is so laborious, that he must have met with every sympathy from the Committee in stating, that, after sitting seven hours at a stretch, he would often be "glad to give a guinea to be allowed to go for half an hour to break stones in Lincoln's-Inn-Fields." He therefore sees no good reason either for diminishing the amount of the examination fee, or the number of those to whom it is appropriated. In various parts of the evidence, there is much amusing attack and defence on both of those points; the thrusts of the Honourable Chairman, however well directed, being often dexterously parried by the learned President, who, like an old campaigner, knows how important it is, under all circumstances, to present a good face to the enemy.

Mr Guthrie does not approve of an admixture of young men among the examiners, because he thinks that examinations would not in this way carry the same weight with them as at present, where they are conducted by men of a certain "calibre and authority in the profession." Younger men could, he allows, spare more time; would be better prepared in later and minuter knowledge; and would be inclined to look to the post of an examiner more for honour than profit; but still Mr Guthrie prefers the seniors; though he is compelled to admit, after a very able cross-examination, that the admixture of "juniors with seniors; the juniors for science and theory, the seniors for skill and practice," though it would not "make the matter better," yet "it might do as well." A young man can examine as well as an older man; but "the public," he contends, "have not the same confidence in his opinion practically." Where, however, was public confidence more largely or more deservedly bestowed than on the late Mr Abernethy, and Sir Astley Cooper? and yet these gentlemen had been for many years in the most elevated professional position in the metropolis, before the principle of seniority, so fondly cherished by Mr Guthrie, placed them even on the Council of the College; or gave them the opportunity of signing the diploma, which it appears that it is so much an object of ambition for the aspirant to College honours to frame and exhibit. Neither of these gentlemen had the power of gracing the country surgery with their names, till they were much above fifty; and yet they were, long before that time, the instructors of half the professional men of the kingdom. This reasoning we might apply much more extensively, but we wish to make no invidious comparisons, either with regard to the dead or the living.

In Dublin, the examiners receive no remuneration; and in Edinburgh, half a guinea an hour; but Mr Guthrie says "more silly" the former for doing "the business for nothing;" and as to the latter, he views the mode of payment as that of "mechanics" rather than "surgeons." We do not know whether Mr Guthrie alludes to the amount of acknowledgment received by our townsmen for their services, or the manner of calculating its amount. If, however, it is to the latter, (for we presume he would have some difficulty in finding, even among our rich neighbours of the south, a mechanic who was paid half a guinea a day, much less half a guinea an hour for his services,) we see no greater degradation in the Edinburgh surgeons being paid by the *hour*, after the manner of the physicians of London, for their lunatic visitations; or by the *day*, as both London physicians and surgeons are paid at courts of justice, than by the *job*, according to the practice of the London College of Surgeons; for it is clear, that, as the President and the other nine members of the Court of Examiners, receive half a guinea each, for every examination, they work as much by the *job* or *piece* (to apply an expression somewhat trenching on the Brusquerie in which the learned President is fond of indulging) as the ordinary artificer.

The examinations do not include medicine, because that is embraced by the Apothecary's Company for the general practitioner; and as to the surgeon only, "we leave him," says Mr Guthrie, "to his fate, knowing that he will never get salt to his porridge, unless he does obtain the necessary qualifications, and a great many more, than we could possibly require." This defence, however, is against the principle of all examinations; and upon the same plea the examination on anatomy and surgery might be dispensed with; for if a surgeon cannot get salt to his porridge, who is deficient in the knowledge of medicine, he may be expected to get neither salt nor porridge, if he is ignorant of surgery, his own peculiar branch, and therefore may, according to this reasoning, be safely left without any examination at all.

Mr Guthrie is of opinion, that middle-sized hospitals, those which contain between 150 and 200 patients, possess many advantages over larger ones; that the treasurer and governor of hospitals in London "have almost invariably appointed the best man;" that their has been a "great misunderstanding" on the subject of "Nepotism;" and that he would think it not unreasonable to expect, that on his returning, his son should have the preference as a candidate to succeed him, if found to be competent to take his place. He does not approve of the French Concours; for though it has been said, that "we give our situations, and you sell yours;" the Concours acts politically, and does not produce, "upon the average," better men than the English plan.

The College of Surgeons, it appears, petitioned against the London University's having a charter, on the ground that teachers and examiners should be distinct persons; and when this reasoning was brought forward by the Committee against the practice adopted by the College of Surgeons itself, when the Court of Examiners was said to "combine in their own persons, the said discordant attributes of examining for, and conferring diplomas, and of being occupied in teaching," Mr Guthrie stated, that no member of the Court of Examiners was engaged in teaching but himself, and his lectures were gratuitous. It must be observed, however, that, without reference to the general question of the London University charter, in which we should be very much disposed to agree with the College, it is not usually that the Court of Examiners has no teachers among its members. Not many years ago, Mr Abernethy, Sir Astley Cooper, and Mr Headington were teachers, at the same time that they were examiners; and this is the case now, if we mistake not, with Mr Samuel Cooper and Sir Benjamin Brodie. We therefore think it a pity that Mr Guthrie should so often contend for optimism on the part of the College, instead of allowing occasional defects, or anomalies in its arrangements.

The museum of the late John Hunter was put under the charge of the College of Surgeons by Parliament, and the sum of L. 27,500, voted at two different times to erect a building for its reception. This valuable collection had been very singularly declined by the College of Physicians, on the ground of the expence of keeping it up; but the College of Surgeons, with much judgment and spirit, did not hesitate a moment in accepting it; and they have employed it with every regard to the public accommodation and advantage, though many difficulties and much delay occurred, in providing the catalogues, and making the other necessary arrangements for its display. Mr Clift, the conservator, and Mr Owen, the assistant conservator, both of them were admirably adapted to the purpose, have now nearly completed the catalogues; but the operations were long delayed by the obstacles thrown in the way of the business by the late Sir Everard Home, who, singular and even incredible as it may appear, actually destroyed many of the manuscripts of Mr Hunter, on the alleged ground of having his special directions to do so.

The museum cost the College between L. 2000 and L. 3000 a year, though the calculation made by government in 1796 was only L. 200 a-year; and scholarships in comparative anatomy are proposed, in order to lead to a taste for that study in this country. This is all highly creditable to the College. But they have besides formed a collection of books, of nearly 18,000 volumes, to which several thousands more are to be added, as soon as the new building at present going on is completed. The building will be fire-proof, and will not only be opened every day from two till four, but to the members two or three evenings in the week; and Mr Guthrie, as we think, takes by no means too sanguine a view of the subject, when he expresses his conviction, that "the College of Surgeons will, in a very few years, be one of the first places that a scientific foreigner will visit in London."

Mr Guthrie goes very much at large into discussion of the claims of the College of Surgeons of Scotland, and particularly of Edinburgh, for some modifications in the regulations of the London College, as far as they are concerned; but we feel that it would be improper to enter upon this subject, till the evidence given by gentlemen from this country is printed, which we hope will be in no long time.

The College of Surgeons of London has shown a very candid and creditable disposition to avail itself of every suggestion for its improvement. Having no coercive powers, it depends on public opinion for its prosperity and success; and we very much question the expediency of any change in its constitution or powers, which are already so effective. It stands in an anomalous position; for while the great body of its members are general practitioners, the council or corporate part of the Society is entirely confined to the very small portion, who do not practise pharmacy or midwifery. But the College, with great policy, gives the same identical designation to all its members; and in will, we have no doubt, studiously afford to all of them every possible indulgence and mark of respect, in order to make them sit as easy as possible, under what we are very much inclined to consider the necessary privations to which they are subject, in their connection with the College. For if the whole of their members were equally eligible to office, the College would lose its prime characteristic of assembling in its council the most eminent of the London surgeons alone. The apothecary, however, acquires an eligibility to office, on quitting pharmacy; and it is therefore some satisfaction to him to know, that his exclusion is *voluntary*, and may at any time be removed, if he chose to exchange a sure and lucrative part of the profession for one that is exceedingly uncertain.

We do not exactly see the necessity for which Mr Guthrie contends, that the general practitioner should be liable to an examination by the College of Surgeons, as well as the Company of Apothecaries, previously to his being licensed to practise. If it is proper that the examiners of that company should examine in physic, without the cognizance or intervention of the College of Physicians, there seems to be no good reason why the same body should not be authorised to examine in surgery, which is just as much a department of the general practitioner as physic. We doubt whether coercive powers would not be burdensome, and unpopular; for the possession of them would be liable to excite expectations as to the protective faculties of the College which would often be disappointed. While the College, therefore, hinges on public opinion, and manages its concerns in such a way as to make its diploma an object of professional ambition, it seems to us to occupy the most desirable position for reputation and efficiency. We are, indeed, much inclined to doubt, whether Parliament would be disposed to concede any general powers to the College of Surgeons, while an act exists which legalizes the independent practice of the general practitioner in all the departments of the profession, and while 39 in 40 of the members of the College are not what may be termed pure surgeons.

With regard to the College charter, we are surprised at its being fettered with the very unusual provision, that its bye-laws should have the sanction of some of the Judges to make them operative. We do not pretend to be learned in English corporation law; but we have seen many charters, from that of the College of Physicians, downwards, and in none of them has there been a similar provision introduced.

The evidence of Mr Guthrie, as President of the College of Surgeons, we have thus given at considerable length; and must now pass to that of Mr Clift, the conservator of the Hunterian Museum.

Mr Clift was apprenticed to Mr Hunter in February 1792, and was continually occupied in the musuem, and in writing for Mr Hunter up to the time of his death, which took place on the 16th of October 1793. He had the entire charge of the collection under Dr Baillie and Sir Everard Home, the executors of Mr Hunter, till the beginning of 1800, when it was transferred to the College of Surgeons, and he was appointed conservator by the College. The museum continued in Castle Street, Leicester Square, (its original position) to 1806, when it was conveyed to Lincoln's-Inn-Fields; but it was not till the year 1813, that the building was so far completed as to allow the museum to be open to visitors. Mr Clift was well acquainted with every department of the museum, and with all the manuscripts belonging to it; and he states that Sir Everard Home made a very copious use of them, in preparing his work on comparative anatomy, and his various papers in the Philosophical

Transactions. It was not till July 1823, that Mr Clift became acquainted with the extraordinary fact, of the destruction of many of the manuscripts, to which we have before had occasion to allude. He was going with Sir Everard to the Medico-Botanical meeting at Kew, when Sir Everard told him, that his house had that morning been nearly set on fire; and on Mr Clift asking him how the accident happened, he answered, " that it was in burning those manuscripts of Mr Hunter." Mr Clift said he could hardly describe his feelings on receiving this information; and observed, " I hope, Sir Everard, you have not destroyed those ten volumes relating to the gallery. He said, 'Yes.' And Mr Hunter's lectures? 'Yes;' and then I mentioned," continues Mr Clift, " perhaps 20 others, which I had a very perfect recollection of." On being asked to go on and describe the state of his feelings, and what passed further, he says, " I can hardly describe them, because I felt that all those hopes that I had entertained were entirely frustrated and destroyed. I considered that my life had been spent in the service of that collection, and I hoped to have lived to see those papers beneficially employed. When I had made inquiry respecting the principal of them, and he told me they were all gone, I said to him, well Sir Everard, there is only one thing more to do. He said, what is that? I said, to burn the collection."

This is the account given by Mr Clift, of one of the most extraordinary and most disgraceful transactions which ever occurred in science. It took place a month or two previous to Dr Baillie's death, when he was too ill to be troubled on this subject; and no such directions as those mentioned by Sir Everard, as his reason for destroying the manuscripts, were ever heard of by Mr Clift or any one else. The manuscripts were, indeed, a part of the museum; and were as much a part of the property purchased by the nation as any of the preparations. But it was important that there should be no evidence in existence to prove the large use, which, according to Mr Clift's evidence, Sir Everard made of them, in the preparation of his numerous publications on comparative anatomy: and it is only curious that Sir Everard should have added to the delinquency of the destruction the folly of avowing it. Sir Everard sometime afterwards stated, that the directions to destroy the manuscripts were given at the time of Mr Hunter's death, " when he was dying;" on which Mr Clift observed, " that is impossible;" and Sir Everard made no answer, for he well knew that Mr Hunter died of a disease of the heart, and that instantaneously. It appears that Sir Everard had not altogether completed the work of destruction at the time of his conference with Mr Clift; and as some expressions escaped him to this effect, the curators, on being informed of them by Mr Clift, followed up the idea, and were able to make some recoveries of importance. Mr Clift states very feelingly and very creditably his general sentiments on this transaction. "I looked upon Sir Everard," says he, "as one of my oldest and best friends; to that hour we had never the slightest disagreement." "When I became acquainted with this unfortunate event, it put a stop to that intimacy which before existed. I had no other cause whatever of complaint against Sir Everard; he was always very kind to me; but I felt that it was a paramount duty that I owed to Mr Hunter's memory, who had taken me from poverty and obscurity and brought me up, or was endeavouring to do so, to do all that I could to endeavour to restore that which was otherwise lost." In the appendix is contained the curious correspondence which took place with Sir Everard Home relating to this transaction.

Sir Astley Cooper was next called before the Committee. He is Serjeant-Surgeon to his Majesty, Consulting Surgeon to Guy's Hospital, and one of the Court of Examiners of the College of Surgeons. His examination takes an important and comprehensive view of the subject of professional education, of which we shall give an outline.

A young man intended for the higher departments of surgery should, Sir Astley thinks, have his preliminary education extended to 18 years of age. He should then be put for 6 or 7 years to an hospital, during which he should be 12 months in the apothecary's shop to learn dispensing; and should afterwards attend anatomy, surgery, midwifery, and the various branches of medical science. One year of the time he should spend in Edinburgh, to which Sir Astley gives every praise for the excellence of its clinical instructions; and another abroad, for the advantage of more ample dissections and operations on the dead body. He should then be examined by the College of Physicians, by the Company of Apothecaries, and by the College of Surgeons; and having passed these examinations satisfactorily, should have the designation of *Bachelor* or *Fellow in Surgery*, with the same rank in surgery, that physicians have in medicine. But it is not likely that the number so educated would exceed 50, and these, he thinks, should have the election of the council of the College from their own number, and be the body from which hospital surgeons and lecturers in anatomy and surgery should be chosen.

The general practitioner should, Sir Astley thinks, have his preliminary education extended to the age of 16 only; should then serve an apprenticeship for three years; afterwards go to a country hospital for one year; and finish with an hospital in London for two anatomical seasons. He should then undergo examinations before the same bodies as have been mentioned for the Bachelor or Fellow in Surgery; but the person thus qualified to act as a general practitioner should, by a further extension of the period of study, be admissible to the grade of Bachelor or Fellow. Practitioners in pharmacy, Sir Astley thinks, should not be admissible on the council, but those in midwifery may; though the latter should not be appointed as *general*, but only as *obstetric* examiners. He is of opinion that the difference of education pointed out, together with a more strict examination at the College of Surgeons, would reconcile the general practitioner as well to exclusion from office, as to not having the power of voting for the College council.

Members of the Court of Examiners, he thinks, need not necessarily be members of the council; but they should not be teachers. The number of examiners should be the same as at present; and it is important that they should be the seniors of the profession, for contests, not of a creditable nature, might, he thinks, arise between juniors and seniors were this not the case; but the moment a man ceases to study, he ought to cease to be an examiner, and should, at any rate, retire from the duties of that office, by the time that he arrives at the age of 70; having a retiring allowance should his circumstances require it.

Sir Astley gives a good deal of information as to the expences of medical education, and he thinks they ought not to be diminished; for the profession is already of too low a station in society. A nobleman once said to Sir Astley, "I have a number of children; I wish to bring one into the church; I believe I shall bring one into the law; as to your profession, it is out of the question." And why should it be out of the question? "It is only," says Sir Astley, "because the profession is not sufficiently educated and scientific, to maintain the dignity which it deserves for its usefulness."

It is to be recollected, however, that there are no bishops and archbishops in medicine and surgery, no Lord Chancellors, Masters of the Rolls, nor Judges, not even a single Member of Parliament, as in the time of Ratcliffe and Friend, among the Halfords and Coopers of the present day; or the Baillies or Abernethys of the past. There is no lack of education and science among physicians at least; but the circumstances now alluded to, with the peculiar nature of the offices required of them, and the mode of payment itself, form, it would appear, a veto against the privileged orders joining their ranks.

There should be a body of some kind or other to confer degrees in London, Sir Astley thinks; and the Bachelor of Surgery might, with great propriety, have the degree of Doctor of Surgery. "Every surgeon practises medicine;" but it would be "incompatible with his duty to be involved in deep medical practice." "Surgery and anatomical pathology" are his peculiar province.

The general practitioner, he thinks, should have a fee for his attendance, and should be allowed to charge something for medicine; but Sir Astley does not think 2s. 6d. per visit enough.

Mr Brodie, now Sir Benjamin Brodie, followed Sir Astley Cooper. He is Serjeant-Surgeon to the King, Surgeon to St George's Hospital, and now, we believe, one of the Court of Examiners of the College of Surgeons. He is of opinion that it would give rise to continual agitation and tumult, if elections into the council were made by the general body of members. Only such persons as were of good preliminary education, and had devoted at least six years to the study of their profession in its various branches, should, after a full and strict examination, be admitted among the electors, and be eligible to admission into the council. The number would not perhaps be above 100, besides such as might settle in the country; and such persons as had an inferior education, should have an apportunity of acquiring the same eligibilities, as soon as they were qualified to do so. He would not interfere with quacks; but public authorities, and particularly parishes, he thinks, should not be permitted to employ any medical officers but the qualified, of whom proper lists should annually be furnished by Government. The exclusive powers of all the chartered medical corporations should, he thinks, be done away; and a general board formed, under a Royal Commission, of Physicians, Surgeons, and Practitioners in pharmacy, to examine all persons for general practitioners, who may have had a three years attendance on lectures and hospitals. Such persons, after passing the necessary examinations, should be denominated *Licentiates in Medicine and Surgery.* After three years more of study, those who wished to obtain the higher degree in physic or in surgery, should have to go to some other board for examination, as the College of Physicians or College of Surgeons. The two higher orders should be of equal rank; for Sir Benjamin considers "surgery to be the most useful and most scientific branch of the medical profession;" and, with regard to designation, he observes with a little more of the sarcastic than is usual with him, that he thinks "the surgeons would be sorry to have *Doctor* put to their names." Surgery is not what it was a hundred years ago; it is a "new profession altogether within the last fifty years;" and some hospital surgeons practise more, some less medicine; but there is a sort of "neutral ground" in physic and surgery, which is open to both; and both the higher orders should be allowed to act as they please as to the practice which they may follow.

"It would be much better," he thinks, "for physicians to practise surgery, where the field of practice is limited;" and Dr Ker of Northampton he mentions as an example of a gentleman exercising both professions, with much reputation, and to great extent; though we rather suspect that Dr Ker dispensed his own medicines, and might, therefore, according to the usage of England, be regarded as a general practitioner.

The possession of a "new profession," into which Sir Benjamin tells us that surgeons have fallen within the last fifty years, is a singular and fortunate event for surgery; but whether this has happened by discovery, by suffrance, or by conquest, we must leave it to the learned in such matters to determine. A "neutral" territory is always useful; but we suspect the Doctors will say, that the ground which Sir Benjamin mentions as being thus appropriated has been entirely derived from their ancient possessions; and that, if surgery is the "most useful and most scientific" part of the profession, it has become so by applying to it principles which are strictly medical.

The examiners in the College of Surgeons should not be appointed by seniority, but should be composed of the senior or junior members of the council, according to qualification, and without regard to their being actually teachers at the time; for as they would belong to different schools, they would act as a sufficient check upon each other. The examinations might be advantageously conducted in the presence of graduates of a certain standing, and partly by written questions, partly *vivâ voce.*

There should be no law, Sir Benjamin thinks, excluding practitioners in pharmacy or midwifery from being members of the governing body; but gentlemen in these departments are less qualified to belong to it, because their principal attention is turned to other subjects than surgery, though there may be exceptions.

The *bonâ fide* medical education required by the public bodies of England is the smallest called for in any country of Europe; for though the College of Surgeons require students to have pursued their profession for six years, yet the curriculum is all completed in about twenty months, "and the other four years may be spent in what is worse than nothing." Pharmacy may be learnt in a short time with a private apothecary or druggist;—but some judicious friends of Sir Benjamin, whose opinion he values, thinks that residence in the house of a practitioner in pharmacy for a short period is exceedingly useful.

Druggists, Sir Benjamin thinks, should be examined by a board of general practitioners.

If the plan were adopted which Sir Benjamin has suggested, the pecuniary resources of the College of Surgeons, he states, would be materially diminished, and thus the necessity produced of furnishing other funds for the maintenance of the museum, which he properly designates as a national object, and indeed an object for the whole world. But there would be no reason why the College should not, even in such a contingency, continue to admit general practitioners as members just as they do at present.

Mr Travers, Surgeon to St Thomas's Hospital, and member of the council of the College of Surgeons, was next examined. He agreed in all material points with Sir Benjamin Brodie, but thinks that there should be a restrictive or prohibitory enactment in the profession, by which every one who might practise any branch of it, without having passed the examination mentioned by Sir Benjamin for the general practitioner, "should be punishable either before a magistrate or by a court of law." The enforcement of this restriction, however, should not, he thinks, rest in any way with the Colleges. Pharmacy should exclude, as at present, those who practise it from the right of voting for the College council, or being appointed into it, for there would be no security, says Mr Travers, were this not the case, that "a majority of the council, if we gave them the right of voting, would not very presently consist of surgeon-apothecaries," of whom "more than nine-tenths" of the College at present consists (p. 124;) but the general practitioner should have all the rights appertaining to persons intended for the higher grades of the profession on giving pharmacy up.

It would be no disadvantage, he thinks, but rather the reverse, if the expence of medical education were a little increased. Branch practitioners should not be admitted into the higher grades; and, with regard to physicians practising surgery, he considers there is no objection to it, but that "a man had better keep to his own department. Society has ruled, and the profession too, that the work is better done if men keep in their own places;" and he adds, "that I would leave it to the good taste and gentlemen-like feeling, and habits of courtesy of the members of the two professions, not to tread upon each others heels;" and yet we fear that the poor doctor is sadly trenched upon, in spite of the feelings which may thus be expected to operate in his protection.

Examiners, Mr Travers thinks, should be chosen, as at present, from the seniors of the council; but they should retire from office at the age of seventy. Midwifery should form a separate branch, having its own particular ranks. A certain portion of education should always be received in London; but if the course of study and the examinations are the same in all the three kingdoms, a qualification received in one of them should confer the privilege of practising in either of the others.

Mr Travers was followed by Sir Charles Bell, Surgeon to the Middlesex Hospital, Professor of Anatomy to the College of Surgeons, and one of the council of that body. Sir Charles is of opinion, that much injustice has been done by the present mode of filling up vacancies in the council of the College; that the most eminent men should be selected; that no practitioners as a class should be excluded; and that the election should be made by a much more numerous body, than at present. He is not prepared to say that the electors should include all the members of the College, but only a "lesser," "but yet a large body," the formation of which would require a good deal of consideration. Those elected by such a body, he considers, must have some distinguishing qualifications to obtain such a distinction. The education of young men for any branch of the medical profession should never be less than three years; namely, from nineteen to twenty-one, both inclusive, in addition to the period of preliminary education; but such as have been apprentices of five years, either in the country or a town, are often, from the want of such preliminary education, and the not being "habituated to study," "incapable of following a demonstration or deduction," to which "you must almost educate them," "in the first course, before they can fully comprehend you in the second."

No candidate should be admitted by the College without a minute and perfect knowledge of anatomy. Midwifery ought likewise to form a part of the surgeon's education, and Sir Charles gives examples of the necessity that a surgeon should possess knowledge in this department. One board he considers as quite sufficient to examine candidates for general practice.

The present distinctions of physician, surgeon, and apothecary may be continued; and though it is "the duty" "of the legistature to point out the distinctions in the profession broadly," still it may be left "to the profession and the public to do as may seem good to them on this subject;" that is, to make "a Doctor out of a Surgeon" if they please, and we presume *vice versâ*, "in spite of all distinctions and designations." "There is no law, from the very highest authority, that can control public opinion," nor can Sir Charles "conceive any law that is to prevent one person from asking the advice of another."

The medical corporations of the three kingdoms should, he thinks, prescribe "the same course of study and examination for the same degree or professional title;" and such titles should give a community of privileges over the whole united kingdom. These necessary changes might, he is of opinion, be best effected by a general board, acting under the control of the Home Secretary, and composed of delegates from the three existing corporations, provided they were made "somewhat more popular."

Examiners should be selected from the highest and most accomplished of the profession; from those who have gained a character in it, "by a life of labour and devotion" to its best interests; but it is not "incessant attention to the direct lucrative part of practice" which "favours that condition of mind best suited to improve the profession," or to raise the practitioner "to just eminence." "One man aims directly, by activity of body and mind, to influence the patient; and the other has a higher aim, through contributions to the science or art, to gain the esteem of his profession. He becomes a consultant; has cases of great interest before him, and yet leisure to improve himself."

Sir Anthony Carlisle, Surgeon to the Westminster Hospital, and one of the examiners of the College of Surgeons, is of opinion that the general constitution of the College of Surgeons is good, and does not admit of much improvement. The council are elected by a general understanding on the subject, from the most highly reputed teachers of anatomy or of surgery, and from the surgeons of extensive hospitals: and rejections which have occurred in his time, and which have amounted to 20 or 30 in number, were all such as he conscientously approved. The seniors of the council, he thinks best adapted for examiners; for he considers "the sagacity of man to progress with his years;" and that, "unless intemperance or disease arrest his intellectual records, he accumulates wisdom till he dies."—(P. 144.)

Two boards he regards as better adapted than one for the licensing of the general practitioner; but as to midwifery, he considers parturition as a natural process requiring no aid; for among the Esquimaux, in Lapland, in India, and in all parts of China, where there is every description of climate, and every state of society, from the lowest to the most refined, the process takes place without any assistance. He sums up his opinion on this subject, which, if we mistake not, has been before published by him, by saying that it is "derogatory to any liberal man, to assume the office of a nurse, of an old woman; and that it is an imposture to pretend that a medical man is required at a labour. The craft, therefore, involves imposture, mischievous interference, and gross indecency."—(P. 146.)

The distinctions between physic and surgery he considers as quite indefinable; for the most eminent surgeons in London "practise also as physicians; and physicians do not scruple to take fees in surgical cases;" and he adds, that he considers himself as perfectly competent to attend to a disease that is supposed to belong to a physician."

Mr Lawrence, Surgeon to St Bartholomew's and Bedlam Hospitals, Lecturer on Surgery, and one of the Council of the College of Surgeons, was next examined. He thinks the mode of internal election now practised in supplying vacancies in the College of council, is unpopular and inappropriate; and that it should be opened to all who practise surgery, and who, therefore, by education and acquirements, occupy a higher grade in the profession than the general practitioner. The number of such persons in London amounts to from 50 to 100: but if the power of voting were also extended to all in the higher grade who might chuse to exercise it, though not being in London, there would be so much of popular election adopted, as "ought, he thinks, to make the change agreeable and satisfactory" to the whole body of members of the College. The augmentation of members by the latter concession would, however, be exceedingly small, as there are very few surgeons out of London who are not general practitioners. Mr Lawrence would not exclude such general practitioners as might evince their possession of the required knowledge "by a sufficient examination," from holding the higher grade in the profession, and therefore being admitted into the College Council. But we do not think his evidence upon this part of the subject is altogether distinct; for entrance into the council could hardly be secured by admittance into the higher order, since he is of opinion "that, if there were no bye-law on the subject," practitioners in pharmacy (and this we presume without regard to their qualifications) would not be elected into the council. If, however, under this view of the matter, a large number of the general practitioners of London choose to qualify themselves for the higher order (which they would be exceedingly likely to do,) they might be expected to resist any understanding as to keeping out of the council all those who might belong to their own department of practice. The general practitioner should have very much the education pointed out by the College of Surgeons and Society of Apothecaries; but Mr Lawrence thinks it would be an improvement, if the apprenticeship were diminished to two years, and two years more devoted to studies in London, or other sufficient medical school, so as to make four years of professional advantages in the whole, in addition to proper opportunities of preliminary education. The professed surgeons should occupy four, five, or six years "in efficient study, as contradistinguished from that nominal study, which occupies so great a part of the six years required by the regulations of the College of Surgeons."—(P. 155.)

Mr Lawrence is inclined to think, that the examination of general practitioners should be invested in a board, consisting of physicians, surgeons, general practitioners, and persons conversant with midwifery; and that such as might wish to be physicians or surgeons alone should "have a more elaborate education, general and professional, and undergo a more strict examination than the general practitioners. They should pass the same examination in the first instance, and be eligible to the higher degrees after some definite period of time ;" being subject to an examination by the College of Physicians or College of Surgeons, according to the respective departments. The duty of supervising the whole of the profession might either be intrusted to the General Board, or the Colleges of Physicians and Surgeons.

Mr Lawrence thinks it bad in principle to have the examiners chosen from members of the oldest standing in the College. They should be the " most eminent persons in the profession, whether juniors or seniors." Their number of ten seems to him too great, if one only is examined at a time ; but a division might be made into three sections, and three candidates examined at once, " which would give a longer time for each examination, and thus render it more searching and effective." He sees no necessity for giving degrees in surgery. " The physician may still enjoy the title of Doctor ;" nor does he see any reason why, if a " properly educated surgeon understands medicine," " he should not practise it ;" and if a physician be properly qualified, it is perfectly reasonable that he should be allowed to practise surgery ; and there are good reasons why every physician should possess a knowledge of it.

Mr Lawrence was examined on various opinions published by him, or expressed by him in public, in the year 1826.

Mr Wardrop, a Member of the College of Surgeons of London and Edinburgh, and Surgeon to his late Majesty, was first examined as to his own education, which was very liberal, and then as to the education of candidates for admission into the Edinburgh College of Surgeons. This, he states, as being of very respectable extent, and as being always preceded by a good preliminary education, in which he considers that young men who apply for the London diploma are often very deficient, because they go out very early as apprentices, and have usually no opportunity, therefore, afforded them of attending to their improvement, as in Edinburgh, where so many young men avail themselves of the advantages of the University lectures during their pupillage. The examinators are six in number, consisting of two senior, two junior, and two middle members ; and he considers this formation of the examining body as useful and efficient.

The present division of the profession he views as unnecessary ; and as being productive of jealousies and bad feelings ; and he thinks that it would be impossible to separate surgery from physic, so as that the surgeon should be prevented from practising in the latter department. The present distinctions in the profession, he regards as being more for the advantage of individuals than the public ; and as being nothing but " associations or cliques of medical men, the same as in other trades; who, by associating with each other, contrive to make employment for one another." It must not be forgotten, however, that if such a sweeping accusation is to be believed, when made against those who contend for divisions in the medical profession, the charge of interested motives may be equally brought against the individual who wishes to monopolize entirely the attendance of a family, instead of occasionally dividing it among those whose studies may better adapt them for particular departments of practice, or the treatment of particular sets of diseases. Mr Wardrop considers the medical part of the curriculum of the London College as not sufficiently comprehensive, and thinks that its regulations, as they respect teachers and hospitals, "have been framed on purpose to serve the private interests of a large portion of the individuals who framed them." The council of the College should, he thinks, have among them a certain portion both of general practitioners and practitioners in midwifery; for the same reason, as he states, "that the College of Physicians do not deem it improper to admit general practitioners into their body." Our respectable townsman, however, is not correct in his representation of the practice of the College of Physicians in this respect, nor in the examples which he adduces in favour of his position; for Dr William Hunter, Sir Walter Farquhar, and Dr Babington, though they might all of them have practised pharmacy at one time or other, could not be admitted into the College till they had relinquished that branch of practice.* They took up a new line, and obtained new eligibilities, just as the general practitioner may do if he pleases.

Mr Wardrop is of opinion that the College of Surgeons have fixed on too large a scale, when they make 100 beds as the minimum for recognized hospitals; and thinks it would just be as judicious "to have a law, that no man should be accounted learned, who should study in a library that contained less than a certain number of books." He considers large institutions as less likely than small ones to answer the purposes of education; and agrees in the forcible nature of the examples adduced by Mr Lawrence in 1826, in corroboration of this opinion.

Richter of Gottingen, as Mr Lawrence states, had only fifteen beds in his hospital: and Professor Langenbeck, in the same institution, has not now more than twenty-five. Scarpa's hospital contained about twenty beds; and Frank's, at Pavia, about the same number. The medical clinic in the general hospital at *Vienna* has two wards of twelve beds each; and the surgical clinic has fourteen beds; eight for males, and six for females. At *Edinburgh* they also act upon the same principle. But though we fully agree with Mr Wardrop in thinking, that far more advantage is to be derived, by studying minutely a small number of cases, than by directing the attention at the same time to a great number, yet, in the instances adduced, there was uniformly an establishment of some extent from which to make a selection. This is particularly the case in Edinburgh; but we are not at all prepared to say, that no number of in-patients, short of 100, will afford sufficient importance and variety of disease for the selection of a few cases, to which the medical and surgical student ought to direct his principal attention. With regard to the changes which may be deemed necessary in the mode of examining candidates for practice, and of supervising practitioners in the different branches of the profession, Mr Wardrop is of opinion that there is great room for improvement, though he has formed no particular plan on the subject. He is inclined, however, to the opinion, that there should be no difference of grades in the profession; that there ought to be one general board of examiners to admit candidates for practice; that this board should be chosen from each of the three existing medical corporate bodies; that there should be in London some means of obtaining medical degrees; and that the power of conferring them might perhaps be advantageously invested in the examining body just mentioned.

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* Dr William Hunter, though he practised as a surgeon and accoucheur previously to taking his degree in physic, never, we are inclined to think, dispensed medicines. Dr Babington was many years apothecary to Guy's Hospital; but this did not make him a general practitioner, or indeed a practitioner at all, in the usual sense of the word.

Mr Scott, the next gentleman called upon, is Surgeon to the London Hospital and the Ophthalmic Infirmary, and Lecturer on Surgery. He is of opinion, that, for a general practitioner, preliminary education should continue till 18; that there should then be one year devoted to the dispensing of medicines, and three more to professional education, in some school where medicine is efficiently taught, making four years in the whole. For the physician and surgeon, preliminary education should be continued till 19, and professional studies carried on for six years; but the general practitioner should be allowed to go into the higher grades on completing the full period of study, and going through the necessary examinations. The studies should be methodized, and the students examined at the close of each year.

The ancient boundaries of practice are now entirely broken down; and it is impossible, Mr Scott thinks, to draw a definite boundary "between the practice of the physician and surgeon." "Both parties," he says, "encroach upon each other as much as they can; but still he is of opinion, that though the education of the physician and surgeon ought to be the same, it is advantageous that some persons should professedly devote themselves to physic, and some to surgery. The three medical corporations should, he thinks, be amalgamated into one, and examiners chosen from practitioners in the three branches of the profession, as well as from accoucheurs.

Practitioners in pharmacy and midwifery are not well qualified to be members of the council; but he considers it proper that the whole of the members of the College should have a voice in the election of the council; and he does not deem it likely, that a large proportion of practitioners in midwifery or pharmacy, would be appointed to that body. There would be no objection to the examinators consisting in part of young men. Vacancies in the council should, he thinks, be filled up by *concours*, from the higher grade of surgeons; and a similar mode would be the most efficient one for supplying vacancies, either in medical appointments, to hospitals, or in lectureships, but no one should retain a medical appointment to an hospital after the age of 65. One hundred beds are a small enough number, he thinks, for a recognized hospital; and there should be no exclusion of any hospital which contains that number.

One year of hospital attendance should, however, always be in London.

Mr Green is Surgeon to St Thomas's Hospital, Professor of Surgery at King's College, and Professor of Anatomy at the Royal Academy. He agrees in the opinion expressed by many who preceded him at the Committee, that there should be a lower grade of education for the general practitioner, and a higher for the physician and pure surgeon. School education should, in both grades, cease at 16; and then there should be two transitional years devoted to the completion of general education. The general practitioner should then spend three years in professional studies, and the physician and surgeon five; but the former should be admitted into the more elevated grades after he is properly qualified. A general council should, he thinks, be formed from the higher grade for supervising the medical profession in all its branches. It should consist of not fewer than 100 members, and should be self-elective; but the members should retire after a certain period of life or service.

The council thus formed would be a body from which the examiners should be chosen, and with which Government might properly communicate on the subject of public health; and it would be very desirable for the same body to have the election of the medical officers of hospitals. Medical degrees should be conferred in London either by this or by some other central board; but we confess that we can hardly conceive how so large and unwieldy a body as his council of 100 could act with any efficiency in the duties assigned to it, except by the appointment of committees for particular purposes. Mr Green supposes, that, with regard to surgeons having degrees, they "might not like to be called Doctors;" and though he thinks there is no definite boundary between physic and surgery, he is of opinion, that there is a great advantage in the practical distinction between physicians and surgeons in large towns. He does not think that the most eminent surgeons in London are persons "eminently qualified to practise medicine as well as surgery;" for they cannot be so well conversant with that branch of the profession as those who have made it "their exclusive study." He is so candid as to admit that "too much" of the London surgeon's practice is medical.

Mr Green considers the College of Surgeons as perfectly justified in excluding practitioners in pharmacy and midwifery from their council; for he believes it would be found "that surgery would be quite overwhelmed, if you were to admit any other members into the body than those who are exclusively surgeons."

Mr Grainger, Teacher of Anatomy in the Webb Street School, gives a history of the origin and progress of that establishment. It commenced in the year 1819, under the late Mr Grainger, his brother, and was intended to meet the great demand which is said then to have existed for dissection in the borough hospitals, where there were not fewer than 400 students, and only one demonstrator. The attendance on his lectures soon amounted to from 250 to 300 pupils in the year, and then medical lectures were superadded. There is now an average number of about 200. Certain regulations made by the College of Surgeons subsequently to the death of his brother, in the early part of 1824, produced considerable difficulties as to recognizing the Webb Street School; but these were got over very much, as Mr Grainger thinks, by the active and friendly exertions of Sir Astley Cooper. Examinations are held by Mr Grainger twice a-week; but though they are voluntary, they are numerously attended. The examinations conducted by the College of Surgeons and the Society of Apothecaries are, together, a fair test of competency; but those of the latter are the strictest, and are looked forward to by young men with most anxiety.

The electors into the council should, he thinks, consist of the body at large; and all the members should be equally eligible to be elected into that body. His idea is, however, that in this case the council would consist of "nearly the same class of men, with several exceptions as at present."

The office of teacher and examiner should be kept distinct; but if teachers are admitted as examiners, private teachers ought not to be excluded. Many of the examiners have been retained in office till too advanced an age; and he gives an example of a gentleman who was rejected, because he gave Larrey's opinion as to the propriety of amputating, before a line of separation in a gangrenous limb was formed; the examiner being ignorant of this modern improvement in surgery. Mr Abernethy, the then President of the College, told him the day after, that his answer was perfectly right; but that, as he did not appeal against the decision at the time (being entirely ignorant of the right to do so) there was no remedy.

The Anatomy Act has had a very favourable operation, and is very propitious to the employment of the summer in surgical anatomy and operative surgery, though summer lectures are not yet recognized.

Mr Carpue has been, till within the last two years, a lecturer on anatomy in Dean Street. He complains much of summer courses of lectures on anatomy not being recognised by the College; and says, that this circumstance "ruined" the late Mr Brookes, he having previously a summer class, of from 120 to 150. Mr Brookes and he were both excluded from the College council.

The council should, he thinks, be elected by the members at large; and he has no doubt that very competent men would always be elected; though there might sometimes be retired army and naval men, more competent men than on the present plan. The mode of examination should, he thinks, not be by question and answer alone, but young men should be required to exhibit their knowledge of anatomy, by demonstrating on the dead body, and in public. Mr Carpue states, that his late Majesty was very fond of anatomy and surgery, and that he had the honour of teaching his Majesty certain parts of anatomy.

Dr James Somerville, the Inspector of Anatomy, was next examined. The Anatomy Act, he states, works well; everything relative to it is conducted with decorum, and exhumation has now entirely ceased. No teacher would receive a disinterred body. The utmost fairness is pursued in the distribution of bodies, though there is much difficulty in obtaining a correct register of the pupils, so as to apportion the supply. Dr Somerville has in no instance had to combat any repugnance to dissection among the lower people; and hospitals, with anatomical schools attached to them, stand high in their estimation, from the superior advantages of treatment which they are supposed to afford.

Previously to the passing of the Anatomy Act, Dr Somerville calculated, that between 200 and 300 bodies were annually applied to dissection in London; but in the first year of the operation of the act, 600 bodies were used in London, and nearly

100 in the country. The number of the present year exhibits a considerable increase in the country, and a small diminution in London. In the principal provincial schools, the numbers, in the years 1832–33, respectively, were as follows: Bath, 2; Birmingham, 23; Bristol, 17; Exeter, 1; Hull, 4; Leeds, 3; Liverpool, 6; Manchester, 13; Nottingham, 1; Sheffield, 11. Many of the anatomical schools in the country, as those at Manchester, Birmingham, Liverpool, and Bristol, he is able to state from personal inspection, "are not surpassed in any place or town." They are well furnished with preparations, and some of them possess very excellent museums. Summer courses, he considers, are very important for surgery and surgical anatomy, and ought to be recognized.

Dr Somerville enters at large into the history of Mr Bennett's proceedings relative to the College of Surgeons; and is of opinion, that degrees in medicine ought to be given in London, by a board elected in a great measure by the voice or sense of the profession, but with a power of appeal to the Home Secretary. The College of Physicians should, he thinks, be so changed, as to include all physicians of "approved character, and of requisite information," and the standard of qualification ought to be a high one. This should likewise be the case with the College of Surgeons, "if it be necessary to keep up a separate college;" and as to general practitioners, they are so merged in physicians and surgeons, as to make a third order hardly required. Upon the whole, however, Dr Somerville is of opinion, that all medical men should at first be examined and admitted as general practitioners, and should, after a certain standing in the profession, be admitted Doctor of Medicine, or Master or Doctor in Surgery, provided they have all the requisites. A good preliminary education should apply to all the orders of the profession.

Mr King, the next gentleman called upon, was an *elève interne* of the Hôtel-Dieu at Paris, and is now a Lecturer an Anatomy in Blenheim Street. He was educated at Paris, where he received several prizes and honourable appointments, by *concours;* and took the degree of Doctor of Medicine. The Court of Examiners for the *concours*, is formed by taking three by lot from the Professors of the Faculty of Medicine, and adding to this body two *agrégés*. The lowest *concours* occupies two days, from one o'clock till four. The examinations are in public, and the questions are drawn from an urn, into which a certain number are put. Before Mr King took his degree, he was examined *dans les lettres*, which included classics, as Horace, Virgil, Cicero, &c. but not Greek; history, geography, and mathematics, and Moral and Natural Philosophy. There are three academies in France where degrees are conferred; namely, Paris, Strasburgh, and Montpelier; and they are all on the same plan. The education of the physician and surgeon is very nearly the same; both of them requiring a period of four years of professional study, after a preliminary education. The particular order in which the studies are to be followed is strictly prescribed.

The board for the superintendence of hospitals in Paris is nominated by the government, and consists principally of Peers of France, or other distinguished men who are eminent in the sciences; for instance, "Count Chaptal, the Duke de la Rochefoucault, and men of that sort." There are no private subscriptions to hospitals in France, though bequests are received. They are principally supported by property belonging to similar institutions before the time of the French Revolution, which was confiscated to the state, and placed in the hands of a commission for the support of the existing hospitals.

Mr King complains much of the regulations of the London hospitals, by which no one can become a candidate for the office of surgeon who has not been an apprentice or pupil; and he feels, that though he might, and probably would have received such an appointment in Paris, had he continued there, yet he is entirely precluded from aspiring to a similar situation in this country. It may be observed, however, as to this point, that, as the hospitals in London have all of them, except Guy's, very numerous governors, who are all open to a great variety of influence; and as there is always for every vacant situation in them, a sufficient number of applicants of respectable talents, and who have received a certain portion of their education in the hospital itself, it must necessarily happen, that a stranger, who may come forward on any vacancy, must make his application under every disadvantage. We doubt, however, exceedingly, whether the rules themselves are so rigid as Mr King understands them to be; and have a strong belief, that, if Mr King, or any other gentleman properly qualified, who might not happen to have been educated in London, could prevail on a majority of the governors of any establishment to give him their vote, there is no absolute regulation which would interfere with his election. It was always considered, that, at St Bartholomew's Hospital, *apprentices* only were eligible to surgical appointments, till the incorrectness of the opinion was demonstrated some years since, by the election of Mr Lloyd, (a pupil, and very competent gentleman, but not an apprentice,) as assistant-surgeon to that establishment. Neither Mr Hunter, Sir Charles Bell, nor Mr Guthrie, were apprentices at the hospitals to which they became surgeons; and many more examples could readily be found.

Many questions were asked in this and preceding examinations relative to the existence of *Nepotism* in filling up vacant appointments in public hospitals in London; but though this is a principle that may be viewed with some degree of suspicion, it does not appear that it has not usually been very properly exercised. Considering the mutual dependencies of society, it is impossible to conceive that a father or an uncle, should not often be disposed to educate a son or a nephew for their own profession; and should not have a wish to advance the interests of such near relations in the establishments to which they may themselves belong. It is, however, the misapplication of this principle that is blameable; and such misapplication cannot often take place; because a young man so introduced has generally had the best opportunities of improvement; has had the example of reputation and success as a constant stimulus to his exertions; and must, moreover, feel, that any sort of deficiency on his part must defeat the objects of his appointment, by its soon becoming apparent to a watchful and jealous public, and particularly to active and well-informed students, whose approbation and good opinion it is so important to merit.

We have thus brought to a close our analysis of the two first parts of the Parliamentary Evidence on Medical Education; and shall anxiously wait for the sequel, and for the propositions which Mr Warburton may be disposed to submit to Parliament, in consequence of his long and laborious investigation. We have every confidence in the judgment and discretion of that gentleman, and in his acquaintance with the subject; and it will afford us much pleasure should he give us opportunity, at no very distant period, of laying before our readers an account of his plan of medical reform, with such observations upon it as may seem to be required.

Art. III.—*Observationes Anatomico-Pathologici et Practici Argumenti*, Auctore, J. L. C. Schroeder van der Kolk, Med. et Art. Obst. Doct. Medico in Nosocomio Amstelodamensi Suburbano. Fasciculus I., cum 3 Tabulis Lithographicis. Amstelodami, 1826. 8vo.

The character of the author of this treatise as a pathological observer would have entitled his work to earlier examination, had not several circumstances concurred to prevent us from devoting to his speculations and deductions that attention to which their intrinsic importance gave them a just title.

M. Schroeder van der Kolk, who is physician to the Hospital of Amsterdam, has been long occupied in the collection and preservation of morbid parts, and is now in possession of a numerous and varied collection of specimens, illustrating several of the most obscure and destructive diseases incident to the human frame. His researches in this department have led him occasionally to modify existing doctrines,—occasionally to form on the pathology of various chronic diseases opinions, which, if somewhat different from those of other pathologists, nevertheless present so large a proportion of plausibility, that they deserve to be more generally known than they at present are.

The present fasciculus consists of an introductory Essay on the Nature of Inflammation, and four Memoirs on Consumption, *Bronchitis*, *Hydrothorax*, and Gangrene of the Lungs. Of these we propose to give a short sketch, partly in order to make known the results of the observations of M. Schroeder van der Kolk, partly to encourage others who have the talents and opportunities to repeat these observations, and show to what extent they agree with nature.

In the introductory essay the author begins his subject by directing attention to the importance of the blood-vessels as the main agents of nutrition, yet with the qualification that they cannot effect this purpose without the aid of the nerves. On this account, he regards the knowledge of the laws, which regulate the actions of these two systems, as quite indispensable in explaining the healthy and morbid actions of the human body. The author regards all our errors and misconceptions in pathology as the result of imperfect physiological knowledge. He might have added, that it is often from disregarding, in the observation of disease, and its effects, even the physiological knowledge we possess, that our pathological principles are vague, contradictory, and often irrational. There is, indeed, in medicine a singular anomaly, that all our physiological principles are regarded as unfit to be applied to pathology and therapeutics; and the moment we begin to study the nature and effects of morbid action, we think all that has been ascertained regarding healthy action ought to be discarded. M. Schroeder van der Kolk makes on the labours of Bonet and Morgagni an observation, which, however severe, must be allowed to possess considerable truth, viz. that although it must be admitted that these laborious inquirers laid the foundation of pathological anatomy, yet they traced imperfectly the morbid degenerations. The description, however accurate, he observes, of any morbid structure or affection, is not sufficient to convey an idea of its nature. It is requisite to consider also the manner in which these changes are accomplished, and to distinguish the parts, which, either as agents or objects, become degenerated. To explain these operations of Nature, he thinks it indispensable to begin with the state of health, more especially in tracing those changes which partake of the nature of chronic inflammation. With the object now specified in view, he discusses the subject of inflammation and its products under the following six questions.

1*st*, What parts of the body principally perform the functions of nutrition, secretion, and excretion; 2*d*, What changes ensue in the perverted action of vessels termed inflammation, and what is to be attributed in these changes to the action of the nerves; 3*d*, In what respect inflammation differs in degree; 4*th*, What are the modifications which the variable structure of different parts of the body communicate to inflammation, and its consequences; 5*th*, What is the influence of the morbid action of the nerves in changing the course and the usual events of inflammation; and 6*th*, What is the structure of the new vessels in the newly-formed parts, and those improperly named parasitical structures, and in what circumstance they differ from the natural condition.

The first question, viz. *What parts of the body principally perform the functions of nutrition, secretion, and excretion*, is very shortly discussed.

After remarking the constant source of perplexity in the circumstance, that, from one and the same fluid, so many different substances are constituted, and the impossibility of explaining it, as Haller seemed inclined to do, by referring it to the varying areas of the capillary vessels, and adverting to the inference deduced by Treviranus, that the living body is the scene of many analyses and compositions, the nature of which exceeds the scrutiny of all our chemical agents;—the author concludes, that all these actions must be referred to the agency of other powers than those of physics and chemistry; and he thinks that these powers are to be found in the action of the nerves, and the vital force or energy, which has the faculty of combining elements, which out of the living body exist only separately, and of producing new substances which art is unable to furnish; and that, in short, the action of the vessels is, as it were, governed by the nerves.

In proof of the truth of the latter proposition, the author refers to the anatomical fact, that even the smallest arteries are accompanied by nerves; that, as Nuck and afterwards Bordeu showed, the secretions were deranged upon tying the nerves; that Treviranus remarked, that, upon dividing the nerves of a member, not only were motion and sensibility abolished, but even the circulation of the blood was after some time impeded and the member at length became dead; that Ens observed that the pulse of the artery of a limb, in which the nerves were tied, was suppressed; that Arnemann found that in vessels, the nerves of which are divided, the blood is much blacker than in sound vessels; and, above all, that many experiments by Wilson Philip show that, by similar injuries of nerves, the secretions and the action of the vessels are disturbed.

That the nerves exercise considerable influence over the process of nutrition, he thinks is demonstrated by the phenomena of paralytic patients whose limbs are eventually wasted. In two cases of long-continued palsy of the feet, the author found the crural and ischiatic nerves attenuated. In one, in the body of a woman of 40, the nervous fibrils were separated from each other by the interposition of fat; the muscles of the thigh were natural; but those of the leg and foot were much wasted, and their pale fibres were interwoven with fat; and the arteries of the leg, from the popliteal downwards, were contracted and so firmly ossified, that they resembled tubes of bone, though the other arteries were sound. In the body of the other subject, the muscles of the *tibia* were similarly wasted; and in this body the arteries of the palsied limbs, though less narrow, evinced, however, the commencement of ossification in the brittleness of their coats, and the thick yellow substance not yet ossified, which was deposited between the inner and the muscular (that is, the middle fibrous) tunic.

Though, in these two cases, M. Schroeder van der Kolk ascribes the wasted state of the muscles and the ossified and steatomatous state of the arteries to the atrophied and attenuated condition of the crural nerves, he is obliged to admit, that impeded action of the nerves does not always appear to produce wasting of the muscles and ossification of the arteries, particularly in consequence of the following case. In the body of a woman of 30 years, who had for six years previous to death laboured under palsy of the feet, the feet were not emaciated, and the vessels were natural; but many marks of deranged nutrition appeared. Though the muscles of the upper part of the body and the arms were sound, at the first lumbar *vertebra*, the *longissimus dorsi*, the *interspinales*, and all the muscles of the limbs, were so completely converted into adipose degeneration, that the *glutei* could scarcely be in any mode distinguished from fat, unless by the insertion of the tendons; in the *rectus cruris* some fibrils traversed the cushion of fat; the *gastroc-*

nemii alone preserved their natural course through fat, but were yellow and pale; and by the general distribution of the subcutaneous fat the foot appeared not emaciated, and the bulk of the muscles undiminished.

The author next refers, in confirmation of the same view, to the phenomena presented by the bodies of two monstrous sheep. In both, the spinal marrow and its emergent nerves terminated at the last dorsal *vertebra*, which was impervious; while the head, chest, and intestines were sound. In one of the monsters there was a *pelvis* with two lumbar vertebræ, the cavity of which was occupied by a portion of spinal marrow unconnected with the upper, and from which the ischiatic and crural nerves proceeded; and in this specimen the bones, muscles, and vessels of the feet were well formed. In the other specimen was a small rudiment of *pelvis* without any spinal marrow or emergent nerves; although there were feet, yet the bones were mere rudiments imperfectly formed; and there were in the feet neither muscles, nor vessels, nor nerves, but in their place only a shapeless mass of reddish bloody cellular tissue. From these cases, and from the analogous one recorded by Dr John Clark, M. Schroeder van der Kolk infers that, without the nerves, the parts cannot be properly formed.

The last mentioned argument had been already adduced as a general physiological and pathological proposition in the doctrine of Nutrition and Developement by Professor Tiedemann, who has also illustrated and enforced it by a very large and conclusive train of evidence. In an able memoir in the third volume of the Journal of Physiology, Tiedemann shows, that the united evidence of the observations of Malpighi, Wolff, Meckel, Brera, Pander, and himself, tends to establish indisputably the inference, that the nervous system, and especially the spinal chord, is the first rudiment which appears in the impregnated ovum, and that it precedes even the traces of blood and blood-vessels. From the cephalic region of the spinal marrow issue the parts of the brain; and from the spinal chord and brain he represents the nerves to be formed, and eventually to give rise, by the developement of blood-vessels, to the formation of the different organs.

To this view of the prior developement of the nervous system, Professor Tiedemann was led, not only by the reflections suggested by the phenomena of the Acephalous Fœtuses, of the recorded cases of which he had published in 1813 at Landshut, a most elaborate and accurate classified history, but also in a more particular manner by the phenomena of similar abortions, which he had subsequent to that period examined. Professor Tiedemann found that in these monstrosities, the deficiency of parts in all cases bore an accurate and direct relation to the deficiency of the nerves distributed to these parts, and especially to that part of the spinal marrow with which these nerves are, in completely formed fœtuses, connected. The spinal marrow being first formed, gives rise to the formation of a number of blood-vessels or veins, which eventually coalesce into the dorsal vessel, or rather the cardiac canal. If the spinal chord be complete, then the other parts and organs are formed in a degree of perfection commensurate to that of the corresponding parts of the spinal chord. If the nervous trunks issuing either from the brain or the chord be complete, then the organs to which these nerves are respectively distributed are also perfect. But if the brain or any of the nervous chords issuing from it or the spinal chord are imperfectly developed or deficient, the organs corresponding are proportionately imperfect. When the optic or auditory nerves are wanting, the eye and internal ear are also awanting, or imperfectly developed. Want of the olfactory nerves and the fifth nasal branch, is associated with want of the internal nose.

In the case of headless abortions, Tiedemann maintains there is further evident proof of the justice of the same views. As in these, the brain, *medulla oblongata*, and twelfth pair of nerves, are deficient, in the head, the organs of sensation and the respective glands, muscles, and bones are awanting. But it is further remarked, that these productions want in the neck, chest, and abdomen, those organs which receive branches from the cerebral nerves, the pharyngeal nerves, the pneumogastric nerves, and the hypoglossal nerves; viz. the *pharynx*, the *œsophagus*, the stomach, the liver, the *larynx*, the windpipe, the lungs, and the heart. To the objection, that Valisnieri and Gilibert found in the acephalous fœtuses dissected by them, the heart and lungs, Tiedemann replies, that very probably the *nervi vagi* were present with the upper end of the spinal marrow, though they are not mentioned. When in these abortions, further, the cervical part of the spinal marrow is deficient, the phrenic nerves corresponding to it and the diaphragm, on the one hand, and the cervical nerves forming the axillary plexus and the superior extremities on the other, are also awanting. In short, in acephalous fœtuses, the organs are presented in proportion as the spinal marrow with its nerves, and the ganglions of the sympathetic nerves are developed; and to the degree of developement of the nervous system the progress of the organs and their stage of developement correspond. From all these facts and considerations, Tiedemann thinks it is clearly and indisputably established, that the nervous system has a prior and greater degree of influence on all the processes and functions of the animal body than the arterial system, especially in those of nutrition and its dependent processes, and that the actions of the vascular system are subordinate to those of the nervous, not only in the normal and healthy, but in the abnormal and diseased state. *

It might probably have been unnecessary to advert here to the views of Professor Tiedemann on this subject, did they not tend very strongly to corroborate the validity of the conclusion, which the present author deduces from the small collection of facts already referred to. The deduction, indeed, is perhaps more remarkable for its fortunate coincidence with that of Tiedemann, than for the strength or number of the arguments by which it is supported in the work before us. This conclusion is, that not only the nerves act upon the blood-vessels and the circulation, but that the secretion of the capillary vessels, or the nutrition of parts, is principally effected and regulated by the nerves, in respect not merely to the quantity, but principally to the formation and quality of the matter secreted. The secretion of fat, he thinks, alone to be less dependent upon the energy of the nerves, because that appears to be the animal matter least elaborated and void of all organic form.

The second question, on *the Nature of Inflammation, and the influence of the Nerves in exciting and maintaining it*, occupies a little more attention.

After a brief view of the opinions of Boerhaave, Cullen, Bichat, Wilson Philip, Thomson, Gruithuisen, Hastings, and Treviranus, on the nature of inflammation and the state of the vessels during its presence, in which he seems to attach great importance to the views of Wilson Philip on the influence of the nerves, he details an experiment which he performed with the view of ascertaining the nature and extent of this influence. In a young dog of six or eight months, he exposed on the 22d December 1824, the ischiatic and the crural nerve of the right foot near the pelvis, and removed a portion from the trunk of the ischiatic nerve to prevent union by regeneration. On the back of each foot near the *tibia*, he then divided the skin for about half an inch, and wet each wound with oil of turpentine to excite inflammation. Though he had divided the ischiatic nerve, yet, as the foot retained some mobility in the action of the *triceps*, he suspected that some small nerve had been left unhurt. The foot, however, was quite paralytic below the *tibia*. He at the same time observed that the crural artery was slightly reddened by several *vasa vasorum*; but as soon as it was touched by the forceps, for the purpose of irritation, the whole artery became pale by the contraction of the *vasa vasorum*, which, however, soon admitted new blood with return of the redness. From this circumstance, the author draws the inference, that the capillary vessels are really irritable.

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* Beobachtungen uber die Beschaffenheit des Gehirns und der Nerven in Missgeburten vom Frid. Tiedemann. Zeitschrift fur Physiologie Herausgegeben, vom F. Tiedemann, &c. Dritter Band. Darmstadt, 1829.

From the wound made in the back of the paralytic foot a few drops of blood issued; but the hemorrhage soon stopped. In the sound foot the bleeding continued longer. Two hours after the operation, the animal eat and seemed well, with the exception of being unable to stand on the right foot.

Next day the wound in the paralytic foot was much drier than that in the sound foot; but a little coagulable lymph was formed at its lower margin. From time to time the wounds were compared to the 13th of January, with this result, that the wound of the sound foot presented much greater symptoms of inflammation,—suppuration having taken place and red granules having sprung in the bottom of the wound; whereas in the paralytic foot was almost no inflammation, though white coagulable lymph was secreted and coagulated, and the colour of the wound was much paler.

On the 15th of January 1825, the vessels of the dead dog were injected, that any marks of inflammation might more easily be distinguished. It was then seen that a small branch of the ischiatic nerve, which gave branches to the *triceps* and other muscles of the thigh, run far backwards, and was concealed, and had thereby escaped division, which explained the reason why these muscles retained their motion during life. Another small branch accompanied the popliteal artery and vein to the lower end of the *tibia*; and here about one inch above the wound was remarkable inflammation; and an indurated mass the size of a pea, penetrated by the nerve and its vessels, had been formed; but beyond this the author could not trace the small nerve, which appeared to be lost in the tumour. The wound in the back of the foot was covered by crusts of coagulable lymph; the margins of the skin were neither swelled nor otherwise changed; and the bottom of the wound presented a pale substance of cartilaginous hardness. In the wound of the sound foot, on the other hand, the edges of the skin were swelled, the wound was smaller in extent, and the bottom was red, soft, and covered with minute injected vessels.

Though the author admits that this experiment is not altogether satisfactory, in the circumstance of one small nerve having escaped division, he nevertheless thinks it is clear, that the division of the other nerves had restrained the inflammation which must have otherwise arisen in the foot. The wound was followed by a milder degree of inflammation in the paralytic than in the sound foot. But the remarkable circumstance was the inflammatory tumour above the wound, which was penetrated by the twig of the undivided nerve; for he thinks it probable that this twig, partaking of the irritation of its nervous branch, had there induced inflammation, the result of which was not suppuration but a sort of cartilaginous production; and in the same manner he explains the indurated state of the bottom of the wound;—all showing that irritation of the nerves modifies inflammation. Upon the whole, he agrees with Langenbeck in regarding the influence of the nerves in inflammation to be chiefly instrumental in promoting the re-union of wounds, in other words, in inducing and maintaining the adhesive inflammation.

In the discussion of the third question, viz. *the differences of Inflammation in degree and in termination*, he distinguishes the process, first, into *sthenic* and *asthenic* as to degree; secondly, as to termination into *resolution*, *albuminous exudation*, *suppuration*, and *gangrene*; and thirdly, as to intensity and duration into *acute* and *chronic*.

The only point of much moment or novelty under any of these heads is that of the formation of new vessels in the effused coagulable lymph. According to Gruithuisen, whose microscopical observations in this department are favourably mentioned by the author, this process commences with the secretion of shapeless or amorphous globules of blood, indicated by the appearance in many parts of red points, which enlarge and emit laterally radiating branches, which anastomosing with similar radiating branches from the neighbouring point, form a network of vessels. In general also larger capillary vessels are formed, in which blood is delayed and stagnates, until by the propulsion and enlargement of the vessel it meets another open capillary artery, with which it inosculates; and by these means at length adhesions and false membranes are formed and enlarged.

These adhesions M. Schroeder van der Kolk found to contain numerous minute vessels, which he easily filled with wax, and observed to pursue a straight course without the formation of branches; but whatever pains he took, he never succeeded in filling these vessels with fine injection so long as the exuding part, viz. the cardiac *pericardium* or the pulmonic *pleura* did not adhere with the capsular *pericardium*, or the costal *pleura*, * but moved about freely and unconstrained in serum or purulent fluid, like filaments. By the aid of the microscope, however, he observed in the lymph covering the pulmonic *pleura*, while still soft and jelly-like, and unattached to the costal *pleura*, numerous delicate vessels, so minute, that they scarcely equalled the size of the $\frac{1}{20}$th or $\frac{1}{30}$th part of a hair in diameter, and the area of which was unable to contain a globule of blood. Of these vessels some terminated here and there so abruptly that the circulation in them appeared yet imperfect. This appearance he does not regard as a reason for believing, that any new vessel of this order is united with another old capillary vessel of the corresponding or applied texture, already existing previous to inflammation; but he thinks that lymph is at the same time secreted by the opposite surfaces, viz. the pulmonic and costal *pleuræ*, and that both parts produce new vessels, which meeting mutually unite.

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* The author of this article is here under the necessity of adopting, for the sake of distinctness and perspicuity, the nomenclature employed by him in his Elements of General and Pathological Anatomy. M. Schroeder van der Kolk uses the old nomenclature of *surface of the heart*, or *lung*, which is known to be erroneous.

This mode of the developement of blood-vessels in coagulable lymph, he thinks, agrees with the idea of Dollinger, who maintains, that the globules of blood in coagulable lymph flow freely and without tunics, like streams of water among sand.

The author very properly reminds us, that the various terminations enumerated by writers are not observed so distinctly in nature as they are represented. Of an inflamed part the degree of inflammation is not equal in all points. At the commencement of a boil there are pain, slight redness, and distension of the capillary vessels with blood; as the skin swells in the centre, and coagulable lymph is deposited, the tumour becomes hard and prominent; suppuration at length takes place in the centre, though the adjoining vessels continue to effuse not purulent matter but coagulable lymph, which is more serous in proportion to the distance of the vessels from the inflammatory focus; while the circumference is terminated by slight redness and congestion of vessels only. The same varieties of products may be observed in wounds; one part secreting purulent matter, while another effuses lymph, or the same producing both.

Adhesion and obliteration of the arteries, which was observed by Dr Thomson in gangrene, M. Schroeder van der Kolk has found to take place, he says, chiefly in chronic ulceration; and he seems to ascribe it to inflammation of the nutrient vessels, (*vasa vasorum*,) by reason of which they cease to convey nutritive materials, when he represents the vessel with the part which it supplies, to die or become softened. This, however, appears to be only one, and a peculiar form of gangrene, since he allows that it is local, and happens principally in cancerous ulcers and *vomica* of the lungs.

In considering the fourth question, on *the Influence of the different structure of parts in modifying Inflammation and* *its events*, M. Schroeder van der Kolk enters into a minute, lengthened, and elaborate disquisition. He begins by reminding the reader, that physiology shows that each organic texture of the animal body possesses peculiar properties, and furnishes by secretion peculiar products; that some tissues are more vascular than others; and that some are liberally provided with nerves, while in others few or no nerves are visible. Though the inflammatory process is under the influence of the nerves, and generally under this influence secretes coagulable lymph, inflammation, however, is not developed in a single instant, but is a progressive process, and advances the more slowly the more chronic it is; and hence, he argues, the product of inflammation differs the less from the natural secretion, the slighter the degree of inflammation is. For instance, the *pleura* and *peritoneum*, which in the natural state secrete serum, do not, when inflamed, immediately effuse lymph, but a more profuse discharge of serum, which contains a larger proportion of albumen the more intense the inflammation is; and when suppuration takes place from such a membrane, the matter is not thick, but lymphy, serous, and fluid, as in puerperal *peritonitis;* and the action of the membrane may be so far changed, that it may lose its serous character entirely, and assume a new structure, as in the secretion of purulent matter. In the skin also, when inflamed by the application of a blister, he thinks it practicable to trace a similar gradation of morbid action,—from the sweat of the sound state of that membrane, to the exudasion of serum, loaded with coagulable lymph, and eventually to the secretion of purulent matter.

These views, he further contends, are more decidedly confirmed by the phenomena of *periostitis*, in which the *periosteum*, when affected with chronic inflammation, secretes bony matter, while in the acute form of the disease it effuses lymph, which is converted into *callus* and bone,—showing that the chronic form of the disease retains longest the character of the original natural secretion.

A fancy adopted by some authors, that the differences in different forms of inflammation are to be attributed to the varying areas and the different number of vessels, with which each texture is supplied, the author thinks possesses some plausibility, in so far as the vessels of muscles, which convey red blood pass much more rapidly into suppuration than the vessels of serous membranes, which contain only colourless fluid. But this difference, he believes, depends in a much greater degree upon the irritability of the organ and the abundance of its nerves or its organic life, as Bichat terms it; and in proof of this he observes, that not all serous membranes suppurate with the same facility, and that he has much more frequently seen the costal *pleura* pass into suppuration than the *peritoneum*. This inference he connects with a fact which he states he has proved by injection as well as microscopical inspection, viz. that the vessels of the *pleura* are both more numerous and larger than those of the *peritoneum*.

We are not sorry to observe that, upon this subject, M. Schroeder van der Kolk takes occasion to call in question the justice of certain opinions, rather peculiar and even heretical, professed by Rudolphi upon the organization and vital properties of the serous membranes. That physiologist, it is perhaps known to some of our readers, denies the existence of capillary vessels in the serous membranes, and he further maintains that the inflammation, vulgarly believed to take place in these membranes, is seated not in them, but in the subjacent tissues. Upon this point it must be observed, that there is no doubt that the anatomical arrangement of the blood-vessels distributed to textures invested by serous membranes, is rather favourable to the idea, that, in the healthy state, these membranes are not vascular. Thus the vessels distributed to the stomach and intestines enter between the folds of the *peritoneum*, and, without seeming to send any vessels to that membrane, are distributed, in their final ramifications, chiefly to the mucous membrane. The present author is also obliged to concede to Rudolphi that, from the *pleura* and *peritoneum* when injected, may be detached a very thin superficial membrane, in which vessels are with great difficulty injected. But he further adds, that he possesses a very thin slip of *peritoneum*, where it covers the intestines, in which the injected vessels may be seen; and with a good microscope he has observed very distinctly in the *pleura*, *peritoneum*, and arachnoid membrane, especially where it invests the spinal marrow, numerous very minute vessels scarcely equalling in diameter the $\frac{1}{80}$th part of a hair, which run parallel in a serpentine course, and in all respects resembled the form of the vessels represented by Zinn in the vessels of the ciliary process; (*Tract. de Oculo, Tab. ii. fig.* 3, *lit. a.*); and in one case of *arachnitis* he injected some very minute vessels passing through the arachnoid membrane covering the annular protuberance; and the preparation of this he preserves.

As to the idea of the inflammation of the serous membranes being referable to the subjacent tissues, M. Schroeder van der Kolk properly remarks, that, under an inflamed *pleura*, the intercostal muscles may remain sound, and furnish no trace of inflammation; and in *pericarditis* it is easy to detach from the surface of the heart (the cardiac *pericardium*,) the false membrane, and observe the cardiac *pericardium* uncovered,—here and there reddish, but exactly as in the sound state, investing the heart and the fibres of the heart, free from inflammation. He further thinks that the serous membranes consist of two folds, at least in the costal *pleura* and *peritoneum*, diaphragmatic, hepatic, and intestinal, where they may be separated; the one superficial and smooth, the other more cellular, and vascular.

We are doubtful to what extent this distinction accords with nature. Assuredly the smooth glistening and free surface of any serous membrane is very different from the tomentose, rough, filamentous, and attached surface; but it may be doubted whether it differs further, than in the latter presenting more clearly and decidedly the characters of the filamentous tissue, by means of which it is attached to the organs which it invests. Inflammation may attack either of these surfaces, and give rise to characteristic effects and products; or it may attack both at the same time; or it may commence in one and spread to the other. It is even not uncommon for inflammation to attack the free surface of the *peritoneum* or *pleura*, and spread to the attached surface; or at least to give rise to characteristic inflammatory products in the subserous filamentous tissue, for instance minute patches of purulent matter. Thus we often see in peritoneal inflammation, either common or uterine, not only lymph effused over the free surface, but minute isolated deposits of purulent matter in the filamentous tissue, connecting the *peritoneum* to the intestine, to the *uterus*, or to the muscular walls of the abdomen respectively. Although, therefore, we are not inclined to adopt the exclusive views of the present author upon the limited nature of the inflammatory process in the serous membranes, we see still less reason to espouse the views of Rudolphi, and to believe, in opposition to daily experience, that inflammation in these membranes is seated in the subjacent tissue, that is to say, in the subserous filamentous tissue. The latter tissue may be inflamed, as we have stated, both along with the former and without it, and in consequence of its inflammation; but inflammation of the subserous tissue is not inflammation of the free surface of the serous membranes, nor is inflammation of the latter surface the same as inflammation of the subserous filamentous tissue.

From what we have now said, it will be easy to see that we cannot altogether assent to the next dogma of M. Schroeder van der Kolk; viz. that the contiguous parts, which differ in structure and action, are rarely at the same time affected by the same degree of inflammation. Assuredly it may happen that inflammation and suppuration of the costal *pleura* may not affect the subjacent muscles, and inflammation of the *peritoneum* may take place without affecting the muscular or the mucous coat of the intestines, and inflammation of the intestinal mucous membrane, may take place without being followed by *peritonitis.* But conversely, cases not unfrequently take place, in which, either from the general violence of the disorder, or from its tendency to pass from one tissue to another, inflammation of the *pleura* and *peritoneum*, certainly more frequently of the latter, are attended or followed with the appearance of inflammatory products in the subjacent filamentous tissue, and may even irritate and inflame the mucous membrane; and it is too notorious that inflammation of the intestinal mucous membrane is seldom violent or long-continued, without exciting also inflammation of the *peritoneum.*

The observation, that tissues of the same nature are frequently thrown into inflammatory states through consent or sympathy, rests on a better foundation. He remarks, that pleurisy often induces peritoneal inflammation, and that the latter may induce the former. It is indeed an important fact, that in the same individual pleurisy, *pericarditis*, and *peritonitis*, may occur simultaneously or successively; that *bronchitis*, *diarrhœa*, and dysentery may take place in the same class of persons; and that all the inflammations called *cutaneous* are by no means restricted to that tissue, but affect one or more of the mucous surfaces first, or simultaneously, or subsequently.

M. Schroeder then advances the proposition, that when inflammation attacks several parts of different structure and action, the inflammation thus developed differs according to the various irritability and vascularity of the inflamed part, and refers, in illustration of the truth of this statement, to sundry preparations in his own collection, and, above all, to the phenomena of new textures and products in different organic changes.

On this head, he remarks that the ossifications and calcareous concretions found in the lungs, the bronchial glands, the *pleura*, *peritoneum*, mesentery, womb, and other organs, are invariably closely enclosed in a capsule or modification of *periosteum*, which having been newly developed as fibrous membrane, and possessing the properties of fibrous tissue, he concludes, was first formed by chronic inflammation, or, if you will, by morbid reproduction, and that, being thus formed, it constitutes a new organ, which performs its proper functions, and like *periosteum* secretes osseous or calcareous matter, and thus forms the substance which it is found to contain. He seems to think, that it is upon the same principle that arterial tissue so readily assumes the ossific and calcareous deposition; and he has no scruple in referring to this principle the origin and growth of the osteo-sarcomatous tumours of the womb. In this species of new growth, however, he further ascribes very great influence to the energy of the nerves, because the extent of the evil bears no relation to the nature of the texture, there being occasionally, in large osteo-sarcomatous tumours, no deposition of bone as yet, or a scanty and sparing deposition only, while in others the whole *fundus* of the uterus is occupied with points, *spiculae*, and masses of bone. From the principle now announced, the only exception which he makes is in the case of ossification of the arachnoid membrane, as it occurs with *arachnitis* in epileptic subjects. The bony patches in this case sometimes adhere, and sometimes are unconnected with the *dura mater ;* commonly they are slightly attached to the *pia mater.* But as these patches of bone seem void of *periosteum*, and as they are often adjoining to a large vessel of the *pia mater*, he allows, that the principle above stated, of the necessity of a previous new *periosteum*, does not in this case hold good.

With the view of forming some precise notions on the formation of these products, and the question as to the necessity of a secreting fibrous capsule, he states shortly the chemical constitution of several varieties of ossified or osteo-fibrous growths, as they were ascertained by analysis, by M. van der Boon Mesch, Professor of Natural History and Chemistry in the Athenaeum of Amsterdam. From this analysis it results, that osseous patches of the arachnoid membrane consist of a large proportion of subcarbonate of lime, a little phosphate, some albumen and cellular tissue ; that those of the *dura mater* contained a larger proportion of phosphate of lime than subcarbonate, some albumen, and tough cellular tissue; that a large hard bronchial concretion consisted of a larger proportion of phosphate of lime, a small quantity of subcarbonate, and a little albumen and cellular membrane ; that a black bronchial concretion consisted of subcarbonate and phosphate of lime, concrete albumen, carbonaceous particles, and a small proportion of cellular tissue ; that a black pulmonary concretion consisted of a large proportion of subcarbonate of lime, a small proportion of phosphate of lime, a little phosphate of magnesia, a good deal of concrete mucus, carbonaceous particles, and a little cellular tissue ; and a hard bony tumour of the womb consisted of by far the largest proportion of phosphate of lime, some subcarbonate of lime, phosphate of magnesia, a little albumen and cellular tissue. The author states, that, with the exception of the pulmonary concretion, the other concretions appear now, for the first time, to have been examined chemically.

This analysis, the author infers, confirms remarkably his statements regarding the nature of the membrane inclosing bony concretions, as performing the functions of a *periosteum.*

The osteo-sarcomatous tumour of the womb, he remarks, which was inclosed in a fibrous membrane, and the bronchial concretion, both contained the largest proportion of phosphate of lime, and made the nearest approach to the constitution of bone. The pulmonary concretion, on the other hand, which, though inclosed in a capsule or membrane only partly adherent to it, and was partly surrounded by dark carbonaceous matter, differed most widely from bone in constitution, as it consisted chiefly of subcarbonate of lime, with a very minute portion of bone-earth. The same character, he thinks, is applicable to the osseous products of the arachnoid membrane, which, being inclosed in a softer, more delicate membrane, differing still more from the fibrous tissues, and containing less phosphate of lime but much subcarbonate, must be regarded as less allied to genuine bone; while, on the contrary, the osseous patches of the *dura mater*, though in external appearance similar to those now mentioned, differed much in containing a large proportion of calcareous phosphate, and thereby approaching to the bony character,—a circumstance which he imputes to the fibrous nature and properties of the membrane by which they are deposited.

All these facts and considerations lead M. Schroeder van der Kolk to coincide with Betschler in opinion regarding the origin and developement of parasitical growths, viz. that each simple or elementary tissue has its own mode not only of nutrition, but of morbid action and morbid growth. Osteo-steatomatous growths, he contends, occur in the *periosteum* only, cystic tumours in the cellular organs, *varix* in the skin, ganglion in tendon, we presume, he means synovial sheaths, polypus in mucous membrane, and scirrhus in glands; nor does he allow that polypus ever takes place from gland, or scirrhous structure from bone. In like manner he maintains that the structure of the new product agrees with that of the basis or fundamental texture in which they take place; the structure of the osteo-steatom resembling that of bone, the structure of scirrhus resembling that of gland, that of polypi being similar to mucous membrane, that of *lupia* being similar to cellular membrane, and ganglion, he adds, to tendon. The nature of parasitical tumours, he further contends, depends on the part in which they grow. Polypi, varix, and encysted tumours may continue for years, or the whole duration of life without danger, because the diseases of the texture in which they take place produce little influence on the economy in general. But in scirrhus or cancer, the changes that take place, sooner or later, sometimes very speedily, affect the constitution.

All these diseases are the result, he thinks, of chronic inflammation or perverted nutrition; and this is the reason why they retain the nature, and follow the same law of sympathy which the parts do from which they are produced.

These inferences on the origin and characters of parasitical growths are in some respects founded on correct observation. But we are of opinion that the observation is in many instances too limited; and we think it would not be difficult to show that the conclusions are stated in terms too general, and that they require very considerable modifications before they can be admitted as received principles in pathology. As one evident example of premature generalization, we may be permitted to refer to the instance of *scirrhus*, which, according to the present author, should take place in glandular structure only, and which never takes place in bone or any other structure not glandular. Now it cannot be denied that, in the decision of this question, a great deal depends upon the signification attached to the term *scirrhus*, which has certainly been used by many physicians and surgeons,—in a manner too vague and indefinite. It is well known, for instance, that many practitioners are in the habit of applying this term to any hard enlargement of the female breast, the male testicle, or even the prostate gland, or the liver in both sexes, when it is known that these are the simple effect of effusion of lymph and vascular distension which eventually disappear, or at least are reduced to a latent state under the employment of appropriate remedies. Others, again, with greater discrimination, confine the term *scirrhus* to certain changes in the structure of the female breast or the male testicle, in which the original texture of these organs becomes either occupied by, or lost in, a mass of hard substance of the consistence of cartilage, but generally with fibrous structure. Others, again, apply the term *scirrhus* to a tuberculated growth taking place in these organs, and proceeding to malignant ulceration. Two questions may be here stated. *First*, Does the texture conceived to be characteristic of *scirrhus* always present the same anatomical characters, and are these characters known with sufficient precision? *Secondly*, Is the scirrhous production or generation confined to one texture only of the animal body? On the first point, we think it must be admitted, that there are more than one variety of scirrhous texture, whether these varieties be referable to mere differences in the external form and interior arrangement in which the matter is deposited or not. On the second point, we think it will be very generally admitted, that the appearance of *scirrhus* is not confined to one texture, but may affect several, perhaps many, of the human body. Degenerations, which cannot be distinguished from *scirrhus*, are found not only in the secreting glands, but in the lymphatic glands, in the skin, in mucous membrane, and perhaps in other textures. It would not be difficult to show, that, with regard to some other morbid products, the conclusions of M. Schroeder van der Kolk are not less liable to modification and rectification. Our limits, however, both in space and time, forbid us from dwelling longer on the subject.

We proceed to the fifth question proposed by the author, viz. *What is the Influence of the Morbid state of the Nerves upon the course of Inflammation, and in changing its usual terminations.*

On this point the author maintains, that the influence of the nervous system is very great; and, with the view of demonstrating this influence, he adduces from various sources, examples of the remarkable influence of the mental emotions and passions in changing the discharges from benign to malignant, and even in inducing fatal terminations. He then adverts to the detrimental effects of typhous, gastric, or bilious fevers, in giving the process of inflammation an unfavourable turn, and its products a bad character; and applies the conclusions thus formed to the explanation of the phenomena of cancer and similar parasitical tumours. Scirrhus, he maintains, is only a plastic secretion in glandular structure; and as the nerves of these organs are disordered, being already inflamed and either rigid or indurated, they are unable to regulate the action of the vessels as in sound parts; and hence, if *scirrhus* proceed to cancer, in other words, if inflammation more severe and intense take place, such inflammation cannot fail in a structure so bad to generate malignant products. In this view, there is a good deal of assumption and some reasoning in a circle. But as the author proposes to explain more fully, and demonstrate more forcibly his doctrines in a future publication, we shall not at present examine them in detail. We do not question the validity of the general inference, that *scirrhus*, when of long continuance, is liable, under the influence of the depressing passions, to pass into cancerous ulceration; but we doubt whether the admission of such a result would very pointedly illustrate the influence of the nervous system in the accomplishment of this change. Every scirrhous structure will, sooner or later, if the life of the individual be prolonged, pass into cancerous ulceration, whatever be the state of the nervous system or the nerves of the part; and it seems more reasonable and pertinent to ascertain what is the influence of the nervous system in causing the original change of texture constituting *scirrhus*, than to inquire why a texture like that of *scirrhus* falls into the ulcerative process.

The sixth and last question which the author discusses is regarding the ***structure of the new vessels in newly formed parts and in parasitical diseases, and in what respect they differ from the natural structure.***

He finds on this subject, that the vessels of new parts differ from the original vessels, in rarely sending off small branches, and presenting the character of straight tubes, which in general run parallel with each other, (p. 41 and 42.) He finds also that new veins are developed, which, like the arteries, run like parallel straight tubes, without forming ramified or divaricating branches. He assures us also, that he has demonstrated the existence of new lymphatics in newly formed productions. At least he injected with mercury, in a case of chronic *hepatitis*, he states, the false membrane connecting the liver to the diaphragm, and brought into view new lymphatic vessels, with evident valves and knotty swellings as in ordinary lymphatics; and as he found upon tracing these backwards to the adherent surface of the false membrane, that they returned to, or were connected with, the surface of the liver by a sort of arch, which received many lymphatics from the liver, he puts the question, whether this arch is to be regarded as the first origin of the new lymphatic vessels?

In considering the new structure of parasitical tumours, M. Schroeder van der Kolk follows the plan of Betschler and Kluge in distinguishing all these tumours into two orders, 1*st*, Those possessing a vascular system of their own, and consequently an internal principle of vitality and nutrition, including such growths as *scirrhus*, cancer, polypous tumours, and other sarcomatous productions; the *second*, those in which the vital principle is external, or derived from the adjoining textures, and in which, consequently, death commences by the centre, viz. *hygroma*, *haemato-cyst*, *meliceris*, *atheroma*, *lipoma*, *steatoma*, and *osteosteatoma*.

He maintains further, that, in the first order of growths, the arteries alone furnish the new product, because he finds that, in injecting the vessels of these bodies, the arteries only, and seldom or never the veins, are injected. In the medullary fungus, he states that he has often so completely filled the arteries, that the entire fungus was quite red, with a few small veins, however, entering the mass; but that in the *fungus haematodes* the disease appears to be seated chiefly in the veins.

From the whole of these observations, experiments, and arguments, he thinks, that he is entitled to deduce the following aphoristic conclusions.

1. To the action of the nerves on the blood-vessels are to be ascribed not only nutrition, that is, the increase of matter, but also the quality and structure of the matter.

2. Increased irritation of vessels, with excited sensibility of

the organ, or energy of the nerves named *organic*, is the first cause of inflammation. By this irritation of the vessels the blood is accumulated in them; and therefore redness and swelling are effects, not causes of inflammation.

3. Without the action of the nerves no inflammation or suppuration takes place.

4. New vessels are formed in false membranes from parts mutually applied to each other, that they may adhere and be united.

5. Different degrees of inflammation may at the same time be united in one and the same ulcer, so that by one order of vessels lymph, and by another purulent matter, is secreted.

6. Gangrene takes place in two modes, either from exhaustion of the vital energy, or from adhesion of the vessels, by which nutrition is no longer performed.

7. The secreted products of inflammation differ in different parts, so much the more as the degree of inflammation is less; so that matter which they secrete in the sound state is still more or less produced during inflammation.

8. Parts differing in structure and action, though contiguous, are seldom affected by the same degree of inflammation;—a difference which depends not on the different area of the vessels, but on the difference in structure and action of the vital force of the part. But parts of the same structure, though remote from each other, are quickly affected by sympathetic communication.

9. Foreign matter produced in any parasitical disease is the effect of reproduction in such a part as is proper for secreting this matter; as the production of osseous matter depends on the presence of a fibrous membrane.

10. Each parasitical disease corresponds in structure and nature with the basis or part in which it grows; and therefore its effects on the rest of the frame depend on the nature of the basis.

11. A morbid state of the nerves appears to impart to inflammation the malignant character, and to produce the secretion of ichorous fluid.

12. Parasitical diseases are universally of two orders; those which have their source of life and vessels within and increase externally, and those which are surrounded by vessels, and derive their vitality and support from exterior textures.

13. Parasitical diseases of the first order appear to receive only arterial capillary vessels, and scarcely or not at all venous capillaries. In the false membranes, however, new veins and new lymphatics are produced.

II. We now proceed to the consideration of the first essay of

M. Schroeder van der Kolk, that, namely, on pulmonary consumption.

The author begins, after noticing the opinions of Hippocrates and Aretaeus, with a view of the respective labours of Hoffmann, Morgagni, Portal, Baillie, Broussais, and Laennec, on the morbid anatomy of the disease. The opinion of Portal on the pathological causes of consumption scarcely merited notice, had it not been for the otherwise just celebrity of the author; for a very limited number of dissections of this disease is sufficient to show that it is not primarily seated in the lymphatic glands of the lung; and it is only wonderful that an anatomist of the learning and observation of Portal could adopt a hypothesis which is at variance with the anatomical facts of the case. Improbable, however, as this opinion is, it has found a strenuous defender in Broussais, who has laboured to extend and rectify the doctrine, and to show that, if the tubercles are not situate in the lymphatic glands of the lungs, they consist in occupation of the lymphatic vessels by tubercular or strumous matter, and who also maintains that these vessels may deposit tubercular matter, not only in the glands but in the parenchymatous tissue of the lungs, liver, spleen, and similar organs.

In this recension of the researches and doctrines of different authors on pulmonary consumption, we perceive, not so much with astonishment as regret, that M. Schroeder van der Kolk makes no mention of those of Dr William Stark, which, for minuteness and accuracy of description, can scarcely yet be said to be surpassed. It is indeed a remarkable circumstance, that neither the pathological researches nor the physiological experiments of this laborious and zealous physician appear to be well known, or to have received the attention to which their merit gives them a just claim, either in this country or especially abroad—a circumstance by no means creditable to the pathological writers of France, Germany, and Italy. They were published in two different forms, first by Dr Carmichael Smyth in 1784, in a paper in the first volume of the Medical Communications, for the purpose, we believe, of making them extensively known among the profession, and shortly afterwards by the same author, in the quarto edition of the collected but posthumous works of Dr Stark, which appeared at London in 1788. The physiological experiments on the effects of different kinds of diet were translated some years ago in one of the Parisian journals. But of the observations on morbid anatomy in different diseases notice is never taken. Nor can we presume that the omission is from ignorance solely, that the present author has not adverted to these researches; for we find afterwards, that in speaking of the descriptions and doctrines of Meckel, he mentions the name of Dr Stark. This circumstance would induce us here to bring these views before our readers. As, however, they would occupy a disproportionate space in the present article, we shall give them in the Department of Medical Intelligence.

It is superfluous to advert to the account given by the present author of the descriptions or the opinions of Laennec; as these are not only well known, but have formerly been considered in this Journal. But a theory of the mode in which tubercles are formed, given by Lorinzer, deserves some notice. This author, who agrees with Baillie and Laennec in representing tubercles to be seated in the cellular (filamentous) tissue of the lung, and who, in other respects, follows Laennec in the description of the anatomical characters of these bodies, thinks that they are formed neither by induration nor suppuration of the substance of the lungs or lymphatic glands, but that their first origin is to be sought in the suppression of the exhalation of the exhalant vessels, in consequence of which the morbid action of the lungs and the retention of matter which should be exhaled, causes a vicarious secretion in the cellular (filamentous) tissue, the result of which is tubercular matter. The formation of these bodies, however, he does not ascribe to inflammation strictly so called; unless this term include every kind of plastic secretion. Lorinzer, however, allows that proper inflammation may afterwards supervene upon tubercles as a stronger reaction of the capillary arteries.

This theory M. Schroeder van der Kolk regards as presenting excessive refinement and questionable distinction, in so far as he esteems it impracticable to distinguish the morbid vascular secretion of tubercular matter, from the morbid vegetation, as he calls it, produced by the reaction of the vessels, or, in other words, the supervening inflammation.

After stating the descriptions of the anatomical characters of pulmonary tubercles by Meckel, the author enters on the important part of his inquiry,—that relating to the formation of these bodies, by giving his own observations.

He observes, in the *first* place, that most authors, in inquiring into the nature and origin of tubercles, have erred by examining them only in the bodies of persons destroyed by consumption. This method he regards as inadequate to the purpose, since in these so many changes have taken place, and the textures of the lungs have been so altered by inflammatory action and its products, that it is no longer practicable to distinguish the tubercular growths in that nascent state, in which alone their origin can be accurately studied. In order to form a clear conception of the origin of the process of tubercular deposition in the lungs, it is necessary to examine these organs in the bodies of persons cut off by other diseases, and in the earlier stages of consumption, when the disease has made little progress. At this stage of the disease it is still uncomplicated with marks of general inflammation of the lung, or its component tissues; and at the worst there is merely topical change.

If in this state tubercles be divided and inspected by the aid of the microscope, it then appears that the air-cells of the lungs are filled with some opaque material, which renders them less pellucid the nearer the eye is directed to the edge of the tubercles. The cells filled with pellucid coagulable lymph are harder than the neighbouring sound cells, and do not admit the air, as easily appears by slight pressure in water. This lymph contained in the cells is sometimes so limpid, that the tubercle can scarcely be distinguished by the eye from the sound structure of the lung, and requires the aid of touch.

In other spots, however, the centre of the tubercle is already white, and losing its transparency, has become opaque; so that by the aid of the microscope, in the centre of the cell little or nothing can be distinguished, and their *parietes* appear united with the matter of the tubercle, while the adjoining cells still contain transparent matter. From this fact the author infers, in opposition to the representation of Laennec and Lorinzer, that in certain air-cells or in a lobule of the lung, local inflammation may be developed, and produce effusion of lymph which obstruct the air-cells.

As this exudation proceeds, the walls of the cells are at length compressed on all sides, and not only unite with the contained lymph; but, as the effusion hardens and becomes opaque principally from the centre to the circumference, a mass of lung thus occupied becomes solid and granular in the centre, and softer at its margins.

The shape of the tubercular mass thus formed depends on the structure of the lung,—a circumstance on which M. Schroeder van der Kolk conceives authors have not bestowed sufficient attention. The lobes of the lungs consist of lobules united by cellular tissue; and each lobule receives a separate bronchial tube, which terminates in many air-cells, all pervious to air,—and a peculiar artery and vein, each subdivided into many minute vessels, all penetrable by injected fluids in the sound state. It hence results that the beginning of tubercular deposition is confined at first to one lobule only, without affecting the contiguous lobules, and is recognized only by the greater opacity and firmness of that lobule than of the healthy ones. It is also found, by injecting the arteries and veins of the lung, that some lobules are less penetrated with this tubercular deposition than others, the vessels of the former being more susceptible of injection, while those of the latter are few in number and less penetrable by injection, and diminish in this manner in number and susceptibility of injection, till in the truly and perfectly tuberculated lobule, the small vessels are completely shut and obliterated, and the large one only remains pervious. In such lobules the structure of the lung can no longer be traced; the shape of the air-cells is destroyed; and in the centre of these tuberculated lobules, which is hollow, suppuration has commenced. Such tuberculated lobules are whiter than the adjoining ones, and are surrounded by thick cellular tissue separating them from the adjoining lobules, which may at this stage of the disease be less affected. Very soon, however, the air-cells of these lobules become penetrated by the same deposition, which in like manner becomes opaque and firm, and agglutinates the cells into a similar firm, inelastic mass, also surrounded by indurated filamentous tissue. When at length several lobules have in this manner become penetrated and occupied by tubercular deposition, with the suppurative destruction proceeding in their respective centres, the coalescence into a single undistinguishable mass is followed by the union of their respective minute cavities into one or more larger ones. In the course of this process, the cellular, or rather what we term the filamentous, tissue of the lung being placed outside the penetrated cells, naturally resists longest the suppurative process, and may even become thickened and indurated. At length, however, this also may give way, and be destroyed partially or entirely; and hence, says M. Schroeder van der Kolk, appears the reason why some anatomists maintain that the tubercle or small *vomica* is surrounded by a membrane, while by others this is denied.

From this account of the progressive formation of tubercles, the author infers, that not only the air-cells are filled and then obliterated by the exudation of coagulable lymph, but that the areas of the blood-vessels are so contracted that they no longer admit the wax of injection, and become obliterated, and incapable of receiving and conveying blood to the ultimate terminations; that hence the centre of the tubercle wastes, and is consumed and degenerated; that the vessels, still pervious, assuming the inflammatory action, secrete purulent matter, which dissolves the tubercle already softened and macerated. M. Schroeder van der Kolk further regards this deposition as coagulable lymph, because by immersion in spirit it is coagulated and rendered opaque; and he therefore contends that it is impossible to adopt the view of Laennec and Lorinzer, or Nasse, that tubercles are formed without previous inflammation. The argument also adduced by the latter author, that tubercular deposition takes place generally in the upper lobe of the lung, whereas peripneumony occurs more frequently in the lower one, he thinks of no moment. He admits the fact; but maintains that it merely shows that tubercular deposition and the consequent *vomicæ* differ from peripneumony, and that chronic inflammation differs from the acute form of the disease.

The question regarding the origin of tubercles from degenerated bronchial glands, he allows to be more difficult of decision,—from the fact, that frequently degeneration and inflammation of the glands of the neck, or some other part, precede the appearance of consumption, and that strumous persons are very liable to the disease. He observes, however, that in examining carefully the bodies of the strumous, when the vessels were filled with fine injection, he found very minute tubercles occupied in different points by concretions, and in general calcareous rather than tubercular matter deposited. In examining such lungs microscopically, he found the minute branches of the bronchial tubes, at least to one-fourth of a line in diameter, every where reddened within by injected vessels, and a beautiful network expanded on the internal mucous membrane; in some of the minute branches, he saw the smaller glands thick and somewhat whiter; the miliary tubercles were surrounded by a net-work of vessels, in which he could distinguish the air-cells still open. These tubercles generally adhered externally to the branches of the bronchial tubes, or to the pulmonary arteries and veins; in some cases a small bronchial tube seemed to end in a tubercle. Externally the pulmonic *pleura* was marked by black round lines like rings, which appeared to be lymphatic vessels. Where the degeneration was a little greater, the cells were obliterated, and the tubercles, the vessels of which were impervious, appeared to have coalesced into a whitish mass.

The author doubts, nevertheless, whether these bodies, which he denominates *miliary tubercles*, were not obliterated vessels, which, when cut across, presented the appearance, but had not the reality of tubercles, the more so, that these tubercles could be traced through the lungs in the direction of ramification. He further expresses the suspicion, that these tubercles are first formed by thickening, and inflammatory degeneration of lymphatic glands, and that this is the reason why they present a different appearance from that of the ordinary tubercles of the air-cells already described,—since they seem to adhere most to the smaller bronchial tubes.

As to the origin of the calcareous matter, he does not admit that these concretions could be formed by the inhalation of dust or sand, since their structure is too complex, and the opinion is sufficiently refuted by analysis; but he thinks, that the surrounding membrane, whether that of a gland, or an air-cell, had so degenerated by inflammation as to assume the fibrous character, and the faculty of osseous or calcareous secretion.

He infers, therefore, that the lungs present two kinds of tubercles; one produced by chronic inflammation of the air-cells, by which their membrane is made to secrete lymph which fills and unites them into a mass; the other more calcareous, produced apparently by degeneration of the minute glands; but both agreeing in inducing inflammation of the adjoining air-cells, and *vomicae*. The suppuration which produces the latter change, and which commences most frequently in the centre, though sometimes in the side of the tubercle, presents this peculiar difference from common suppuration, or that which takes place in wounds, that, whereas in the latter granulations are formed by which the cavity is filled, in the former no granulations take place, because no new vessels are formed; and as the vessels are obstructed and convey no new matter, the tubercular mass is softened by a species of partial death. When this suppurative destruction begins, it proceeds in general till the tubercular mass is broken down and excavated; and it is much less common to find a tubercle partly dissolved than entire, or a small *vomica*, after the tubercle has been destroyed by suppuration. In this state the *vomica* is lined by a thin vascular membrane, sometimes by a thick yellowish one; and if small it is rarely traversed by any vessel; but this is not unusual in large *vomicae*. The author also observes, that these tubercular masses afford, in the process of softening, an illustration of the general principle formerly laid down, that every inflamed part and ulcer presents at the same time different degrees of inflammation. The centre of the tubercle may be dead or expelled after the process of solution; its crust may be in a state of suppurative softening; the circumference may be inflamed; and this process diminishes in the parts of the lung farthest removed from the margin of the air-cells.

In the manner now mentioned, the cavity of a *vomica* is progressively enlarged, until in desperate cases of consumption the patient sinks under the disease. The extent to which the lung is destroyed before this event takes place, varies according to the age of the parties. In his inspections M. Schroeder van der Kolk states, that he found generally larger *vomicae*, that is, that the lungs were more completely destroyed,—in old than in young men. In men of 40, 50, or 60 years, he has often found the lung altogether destroyed; but in younger persons not more than ⅓d part, or a half-destroyed. From this fact he infers that the higher vitality and irritability of the bodies of young persons cannot endure the destruction of so large a portion of the organ, and that, therefore, the fatal event is earlier.

Stark calculated that the part which remains fit for the admission of air may be estimated at a medium to be about one-fourth part of the whole substance of the lungs.

This account of the original deposition and the anatomical position of pulmonary tubercles, it will be seen, is quite peculiar to M. Schroeder van der Kolk, and differs from the accounts given by all other pathologists, one only excepted, who has since adopted and confirmed the statements of the present author. While by all others it was represented that tubercles were deposited in the cellular, that is, the filamentous tissue of the lung, the present author maintains, and has been the first to maintain, that these bodies are deposited in the air-cells, or pulmonic vesicles, by secretion from their mucous membrane, in a state of chronic inflammation; that they are deposited in a fluid state, and undergo consolidation, during which they are not only firmly united with the membrane by which they are secreted, but they cause the union of several contiguous air-cells into a solid mass impervious to air; and that, in the course of this process, they necessarily first compress and then obliterate the vessels from which they were secreted. This view, it will be observed, is completely the inverse of what has been hitherto taught on the original anatomical position of pulmonary tubercles; for while it has been hitherto believed, that, in their developement, growth, and dissolution, they proceeded from the filamentous tissue, or parenchyma of the lungs, towards the mucous membrane, first compressing the air cells, and then inflaming them, and destroying them, the present author represents all this mischief to begin in the air-cells, and proceed from their free or open surface to their submucous filamentous tissue, and to that of the lungs.

All these points, we think, the author has made pretty clear and manifest; and though his theory of the developement and growth of tubercles is quite the reverse of that which has been hitherto taught, it must be allowed that he renders it quite as credible and intelligible as any of the previous ones, and that it explains much more satisfactorily all the phenomena of this dreadful species of disorganization.

Nor is this a matter of mere speculative interest. The knowledge of the true mode of the developement of pulmonary tubercles is the most likely method of enabling us to prevent their developement and growth, and to counteract their effects.

Though M. Schroeder van der Kolk has been the first author to propose the theory of the developement of tubercles now mentioned, he is not the only one. The theory has been since adopted by Dr Carsewell, Professor of Pathology in the London University, whose beautiful illustrations of the early commencement of pulmonary tubercles may be regarded as affording the strongest confirmation of the accuracy of the views of the present author. To M. Schroeder van der Kolk, however, belongs all the merit of originality.

The morbid anatomy and pathology of this disease presents, however, still more important and curious points for investigation. To understand thoroughly the mechanism of the formation of a *vomica*, the author investigated the degenerations of the various elementary tissues of the lung, viz. the state of the vessels, of the bronchial tubes, of the lymphatic vessels, and finally, of the nerves.

1. *The state of the vessels.*—By various learned physicians the question has been stated, what is the reason why the blood-vessels of the lungs, even of the largest size, are entirely destroyed, yet without causing hemorrhage? Dr William Stark had shown that the large vessels of the lung, as they approached a *vomica*, underwent sudden contraction, so that a large vessel which at its origin measured nearly half an inch in circumference, could not be cut open farther than one inch; that the internal canal of such vessels is very small and filled with a fibrous substance; and that they rarely or never allowed either air to be blown by them into the *vomicæ*, or wax to be injected through them into the diseased parts. The accuracy of this description had been generally confirmed and admitted by Meckel. The present author, however, unaware apparently by whom the facts had been originally observed, conceived that they did not sufficiently explain the difficulty; and, with the view of ascertaining their accuracy, he injected the vessels of tuberculated lungs, and again examined them with particular minuteness. From these it appears, that the obliteration begins in the small vessels and proceeds to the large trunks; that this obliteration is the effect of inflammation of the *vasa vasorum*, by which lymph is effused into the canal of the vessel which unites its walls and renders its trunk impervious; that the *vasa vasorum* may not be so much affected by this inflammation, as to interrupt their circulation, and may continue, consequently, to nourish the obliterated trunk, which then forms the *septum* described by Laennec, and what the present author denominates a *trabeculum*; but that in those instances in which these nutritient vessels have become involved in the inflammation and obstructed, the trunk becomes black, dies, and is dissolved in the general suppurative destruction of the tubercular mass.

2. *The changes induced in the bronchial tubes.*—It has been already shown that pulmonary tubercles are produced by the air-cells which constitute the extremities of the bronchial tubes,

being filled with coagulable lymph. When the mass thus formed is dissolved in suppurative destruction, the minute bronchial tube by which the *lobule* is supplied is involved in the same process, which, beginning at or near its extremity, spreads successively upwards towards the trunk, so that the tube is terminated by truncation, as it were, at the margin of the *vomica*, a fact which is easily demonstrated by the introduction of a probe, which passes through the bronchial tube into the cavity of the *vomica*. The inner membrane of such a bronchial tube is found red and swelled; and these marks of inflammation are more intense and the products are more purulent, the nearer the membrane approaches the *vomica*. The author adds, that the inflammation thus developed at the pulmonic end of a bronchial tube may spread slowly to its tracheal end, till it reaches the windpipe, and even the laryngeal membrane, where it induces hoarseness, and those pains of the larynx by which consumptive persons are distressed. The pervious state of the bronchial tubes, in contradistinction to that of the blood-vessels, the author attributes to the elasticity of the cartilage, which naturally resists collapse or compression,—and also to the character of the mucous membrane, which, when inflamed chronically, is more prone to the secretion of mucus or the formation of purulent matter than the exudation of coagulable lymph.

In some rare instances a bronchial tube escapes for some time destruction, notwithstanding the dissolution of the tubercular mass by which it is penetrated; and the author possesses a preparation in which, among several remains of vessels, is seen a considerable branch of a bronchial tube passing through a *vomica*. Ultimately, however, such bronchial tubes are destroyed, if the life of the patient be sufficiently prolonged.

From these facts the author takes occasion to introduce a practical remark on the supposed power of emetics in rupturing, as it is sometimes said, a *vomica*, and expelling at once a large quantity of matter. Such rupture, the author asserts, cannot be effected without inducing hemorrhage more or less profuse, and infiltration of the surrounding tissue of the lungs with purulent matter. If, however, a large bronchial tube traverse a *vomica* full of matter, yet do not give vent to the same, suppuration of that tube or laceration produced by coughing may quickly furnish an outlet to the matter, which entering the mucous membrane, stimulates it, and excites cough, by which the purulent contents of the *vomica* are at once discharged in great quantity.

8. *The state of the lymphatic vessels.*—These vessels it is extremely difficult to distinguish in the lungs; and though the present author has injected with mercury in lungs affected

with *vomica*, some lymphatic vessels of the pulmonic *pleura*, yet he never found any one of them penetrating the substance of the lung. Subsequently, however, in the sound lung, he succeeded not only in injecting with mercury the lymphatics of the whole surface of the lung, (the pulmonic *pleura*, we presume,) but traced several branches into the pulmonic *parenchyma*, so distinctly, that he was satisfied that the lymphatics encompassed the lobules like meshes of net-work; and further traced to a small black tubercle in the surface of the lung, not far from the windpipe, several lymphatic vessels, which partly penetrated the tubercle and partly poured mercury into it. From this circumstance, and from the analogous one, that tubercles in this situation often contain calcareous matter, M. Schroeder van der Kolk thinks it not unlikely, that the calcareous tubercles are the result of degeneration of the lymphatic vessels or glands.

4. *The state of the Nerves in tuberculated and excavated lungs.*—It appears that the nervous filaments terminate with the vessels at the margin of the *vomica*, so that they appear to have been converted into a species of cartilage or tough cellular tissue. In one case described by the author, the nervous branches were reddened and thickened, numerous vessels being brought into view upon them by means of injection. Like Mr Swan, the present author has seen in phthisical persons the pneumogastric nerve reddened and thickened; but in other cases he admits that he found it quite unchanged, so that he is averse to make any positive conclusion.

M. Schroeder van der Kolk then proceeds to another question; viz. by what means, in cases of extensive destruction of both lungs, or the total destruction of one, the blood which in the sound state required to be circulated through these organs, is then circulated through the remaining part of a single lung. Of this, he thinks, no satisfactory explanation has been given. The emaciation which takes place in consumption, he argues, is not peculiar to that disease, but is observed in others in which the vessels of both lungs are filled with blood, and carry on circulation; consequently, he infers it cannot be admitted that the blood is deficiently or ineffectually circulated. In inquiring into this matter he found, in the *first* place, that in very many phthisical subjects, in which, in the region of a *vomica*, adhesion of the costal and pulmonic *pleura* had taken place, matter injected into the vessels of the lungs filled the vessels of the costal *pleura*, and that this matter passed from the pulmonary artery, not only into the vessels of the costal *pleura*, but into those of the *pericardium* and *oesophagus*. He was led, therefore, to infer, that the intercostal arteries might convey the blood from the pulmonary artery into the left chambers of the heart. Accordingly, he found, in the second place, that, by injecting the intercostal arteries with yellow matter, and the pulmonary veins with red, the former had passed into the lungs themselves, and that, conversely, the intercostal veins were filled with the latter. He concludes, therefore, that, in the case of extensive destruction of one lung, or partial destruction of both, nature pursues a similar course to that which she adopts in cases of aneurism, and that the blood from the pulmonary artery is carried to the left chambers of the heart, not by the pulmonary veins, but by means of the intercostal veins.

This explanation, though ingenious and deserving attention, as founded on anatomical facts, is nevertheless partial, and does not embrace all the facts of the case. M. Schroeder van der Kolk shows in this case the same ignorance or disregard of the facts ascertained by English pathologists, as, we have already remarked, he evinced in the case of Dr Stark. He appears to be quite unaware that Mr Abernethy had, so long ago as in 1798, shown, by injecting the arteries and veins of the heart, in cases of very bad pulmonary consumption, that the injections readily flowed into the chambers of that organ, and that the left ventricle was first and most completely filled. He found that the channels of this injection were the *foramina Thebesii*, which, though in the natural state, few and small, became numerous and large in disease of the lungs, which necessarily impedes the circulation of the pulmonary artery, and thereby distends and gorges the right chambers of the heart. To M. Schroeder van der Kolk, it seems to be equally unknown that the same author observed thirteen times in the course of one year the *foramen ovale* more or less open, in the bodies of consumptive subjects, and in several of these instances the aperture sufficiently large to admit of a finger being passed through it. *

It must be superfluous to adduce evidence in support of the statements of a pathologist like Abernethy; but we may be allowed to add, that we have in a considerable proportion of consumptive cases, had occasion to verify the latter part of the observation, regarding the patent state of the *foramen ovale*. That aperture, though not always open, we have seen present, in a considerable number of consumptive cases, different degrees of patency. In one case, last winter, in which the immediate cause of death was pneumothorax and pleurisy from rupture of a large vomica into the right pleura, the *foramen ovale* was sufficiently large to allow the tip of the little-finger to be carried into the left auricle. So far as we have had opportunities of observing, we should say, *cæteris paribus*, that when the *foramen* is large and open, the *foramina* of Thebesius are small and indistinct, perhaps few in number; and when the foramen is small and valvular, the *foramina Thebesii* are comparatively large and numerous. We may add, that, in these cases, few and small adhesions were observed; and this must be associated with an admission, which the present author is compelled to make, viz.—that in several cases of consumption he had twice found *vomica* without adhesion.

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* Observations on the *Foramina Thebesii* of the heart. By John Abernethy, F. R. S., &c. Phil. Trans. 1798, Part I. p. 10.

Though we have taken the liberty of controverting, in the foregoing manner, the views of the present author regarding the changes in the current of the pulmonary circulation, we have further to remark, that much of the reasoning, which constitutes his premises, is founded on a most fallacious delusion: He presumes in his reasoning, that the pulmonary circulation proceeds, as to its effects in consumption, as in the state of health. This, however, is a most unfounded notion. The pulmonary circulation is not only considerably interrupted at the commencement of the disease; but this interruption continues to be aggravated daily, until it amounts to almost complete suspension; and there are no instances in which one-fourth, or one-third, or one-half of one or both lungs is rendered unfit for respiration, in which circulation is not in a proportionate degree impeded and interrupted. If it were not so, why should consumptive persons be wasted, lose strength, and eventually expire. The blood does make an effort to circulate through the branches of the pulmonary artery and veins to the left side of the heart; but the effort is abortive, or at least much impeded and constrained; and but a small quantity of blood can move, compared with what circulates in the sound state; and instead of moving with normal rapidity, it is gradually retarded until it stagnates entirely.

Notwithstanding the fallacy thus involved in the views of the author, he contends that local blood-letting, by means of leeches applied to the neighbourhood of the *vomica*, and, above all, to the heart, where there is reason to believe there are adhesions, and consequently newly formed vessels, as a collateral circulation, —is much more efficient in relieving the symptoms than general blood-letting, which, he thinks, can only diminish the force of the pulmonary circulation, by diminishing that of the general circulation. To us, on the contrary, it appears that, from all the evidence *a priori* that has now been adduced, general blood-letting is much likely to afford relief and act on the process of the disease, than local blood-letting. The latter must act chiefly on an effect and on one partial effect. The former acts at once on the cause, and on the two effects already mentioned as resulting from that cause.

Our limits will not permit us to enter into the account given by the author of the state of the other organs. Nor is it very requisite: as here his observations are less original and peculiar, than in the part of his subject already discussed. Of the affection of the mucous membrane of the intestines he does not appear to have formed a very clear or accurate conception. "Ulceration," he says, "of the villous coat of the small intestine or of the colon I have often but not always found. These ulcers arise, first, like small pustules, which, distended with fluid, are burst, by which the ulcer is formed and slowly enlarged, affecting, first, the villous, then the muscular coat, so that in its centre the peritoneum alone covers the cavity of the intestine. Externally is formed a cicatrix; and lymphatic vessels, proceeding from such an ulcer, are generally distended with tough white matter."

The truth is, that the intestinal ulcers differ as they take place in the *ileum* or in the colon. In the former the preliminary inflammation very generally attacks the mucous follicles of Peyer, near the lower end of the bowel; and it is here that they present most commonly the appearance of pustules of the intestinal tube, by the swelling and elevation which takes place in one or two follicles. In the colon the ulcerative inflammation begins generally also in the follicles, which are here isolated from each other, and spreads rapidly, and irregularly, forming in general ragged ulcers.

From the remarks on the Symptoms, which present no peculiar interest, we pass to those on the treatment of the Disease.

He, in the first place, very properly observes, that the preceding account of the formation of pulmonary tubercles shows clearly, that consumption is a disease of inflammatory origin; that the resolution of these bodies must be very nearly, if not altogether, out of the question; and that remedies administered with this view must be quite useless and inefficient, if not positively hurtful; since either the obliterated area of the vessels must be reopened or new vessels must be formed. If it be allowed that tubercles may be absorbed, the walls of the cells, destroyed and aggregated into a mass, would be at the same time destroyed; and therefore a cavity or *vomica* would be formed, which, if produced by art, would be of little benefit to the patient. The author, therefore, thinks, that the only remaining remedial measure is to diminish and restrain the destructive effects of tubercles, that is, to prevent the inflammation from making further progress or involving the adjoining lobules of the lung, and to prevent the tubercle from passing into a *vomica*. For this purpose, he represents emollient cooling remedies, mild, digestible, moderately nutritious diet, avoiding most cautiously all stimulating agents, to be most serviceable; and, should the inflammatory condition affect the economy sympathetically, then small blood-lettings or the application of leeches are beneficial. For the latter purpose, however, he regards derivative remedies as best of all calculated; since they derive from the lungs and draw outwardly the orgasm of the vessels, and either remove threatening or incipient consumption, or not unfrequently arrest its progress. These therapeutical views, the author founds on anatomico-pathological inquiry. Lungs affected with *vomicae*, he argues, adhere by their *pleura* to the costal *pleura* corresponding; and the new vessels by which the adhesions are traversed maintain a communication between the vessels of the lungs, and those of the external parts of the chest. Leeches, therefore, applied over those parts of the chest must draw blood from the lungs much more directly than general blood-lettings can accomplish. Issues and other external derivatives further, he believes, must, if placed over the affected spot, be capable of drawing most strongly outwardly the action of the vessels.

After stating these preliminary principles, he, in the *second* place, reasons in the following train.

Every inflammation proceeding to suppuration is preceded by albuminous secreting inflammation; that is, the exudation of lymph is a slighter degree of inflammation than the formation of purulent fluid. By diminishing, therefore, the inflammation which is necessary to the process of suppuration, it is probable that it may be reduced to the degree of albuminous exudation. The main peculiarity in the *vomica* is, he conceives, that, as the exudation of lymph is wanting, there is no reproduction of parts, but a consumption of the lung;—whereas in a recent wound, suppuration is accompanied with exudation of lymph, which is furnished by the vessels, according to the demands of the cavity, and moulded into granulations. In some *vomicae*, suppuration is found to be completed so as to leave the cavity quite empty; and in instances of this description, the author found the walls of the *vomica* abounding with innumerable vessels, which appeared to be recently formed, in so far as they differed widely, both in form and course, from the shape of the cells, and the vessels surrounding the cells; and as he did not find this in *vomicae* filled with purulent matter, these, therefore, he infers were the beginning of healing. If, therefore, he argues, in a suppurating *vomica*, the inflammation and vascular orgasm can be reduced to that degree that the surface shall secrete lymph, instead of purulent matter, the further enlargement of the *vomica* may not only be prevented, but there may be a hope, if the destruction be not extensive, that the cavity may slowly unite, and the patient may recover.

He adds, that he has confirmed the inference of Laennec, regarding the contraction, consolidation, and healing of cavities; and that he has often found closed or cicatrized cavities in the lungs of aged persons.

The great means by which he expects to effect, and believes that he has effected, this desirable consummation, is the derivative power of the issue or moxa; and in illustration and confirmation of its influence, he gives the details of five cases of apparently tubercular consumption, in three of which this remedy was employed with favourable result.

In the first case, that of a young man of 21, in whom symptoms of consumption had supervened on formidable *haemoptysis*, opposed by venesection, and other antiphlogistics, and laxatives, a large issue applied to the pained part of the right side, was in no long time followed by disappearance of the fever, abatement of the cough and expectoration, return of appetite, recovery of the flesh and strength, and, in short, the disappearance of all the consumptive symptoms.

In the second case, a girl of 16 was admitted into the Amsterdam Hospital, in the month of July 1825, for consumptive symptoms supervening after four attacks of *haemoptysis*. Blood-letting, general and local, was employed; but the symptoms proceeded; and by stethoscopic examination, pectoriloquy was distinctly recognized between the second and third rib of the left side. To this part an issue was forthwith applied in the beginning of August. After some time the hectic sweats began to abate; the cough continued obstinate, but at length gave way in the beginning of October; and she left the hospital in the beginning of November, free from consumptive symptoms, and with the respiratory murmur in the site of the issue, it is stated, distinctly audible. In March 1826, she returned with symptoms similar to those under which she formerly laboured. For these, venesection was performed, the issue was again applied, and nitrous refrigerants were administered; and she again recovered.

In the third case, a girl of 19, after overheating herself in the spring of 1824, presented herself on the 21st October, with distinct symptoms of consumption. As there were signs of a *vomica* occupying the upper part of the right lung, with some symptoms of a similar change in the left, the moxa was applied on the 26th December, to the chest between the second and third rib of the right side. After various oscillations in the symptoms, the cough, hectic fever, and expectoration, all began to abate about the end of January; and the strength increased so much that she could quit her apartment, and walk about in the month of March. On the 18th, however, she was attacked with febrile symptoms, and most unexpectedly, during the ensuing night, with profuse *haemoptysis*, which proved fatal by suffocation.

In both lungs was a *vomica*; that in the right large and void of adhesion to the chest; the left adhered strongly. The cause and source of the hemorrhage are not explained.

In a fourth case treated by M. van der Feen, and in which the assistance of the author was requested to determine the place for applying the derivative agent, a gentleman aged 29, accustomed to free living, and of gouty habit, was attacked sud denly in October 1824, with *haemoptysis*, which was treated by blood-letting, general and local, antiphlogistics, sedatives, and moderated diet, but which presented in the close of January 1825, decided symptoms of consumption; and at the close of February the case was regarded as hopeless. M. Schroeder van der Kolk having recognized pectoriloquy in the right lung between the second and third rib, applied on the 4th of March the moxa over the place, so as to produce a deep eschar. The cough and expectoration were decidedly abated on the 13th; and on the 22d the patient was capable of being several hours out of bed. Flesh and strength also returned; and though he had an attack of *haemoptysis* with fever, on the 7th of May, he recovered under the antiphlogistic treatment so completely, that at the close of June he was free from all pulmonary complaint, and continued well in 1826.

In this case the patient took internally, first a mixture containing nitre and henbane *(Hyoscyamus,)* then one containing the seeds of Water Hemlock *(Phellandrium aquaticum,)* with a little ipecacuan, to the former of which he ascribes great benefit. The water hemlock, indeed, is used by the German practitioners rather extensively, and with much confidence in its therapeutic powers.

In the fifth case, a girl of 23, of a family decidedly consumptive, the mother and two sisters having become the prey of the disease, was attacked in 1825 with dry cough, which in no long time was followed by the symptoms of consumption. The author was requested by the attendant practitioner, M. Luber, to specify the seat of greatest mischief; and he found distinct pectoriloquy in the upper lobe of the left lung below the clavicle, and indistinct pectoriloquy in the right lung. At the pit of the stomach had been previously applied an issue, which gave much pain. This was withdrawn; and the moxa was applied below the clavicle on the left side. The same day a third sister died of consumption. In the course of a few days the cough and expectoration were sensibly abated; but the general febrile symptoms continued; and death took place on the twelfth day after the application of the moxa, and before it had produced suppuration.

In this case the author thinks, with some justice, that the destruction of the lungs was too extensive to admit of recovery under any means. In short, wherever there is pectoriloquy on both sides, or a large *vomica* on one, there is little reason to expect recovery. This view is confirmed by the subsequent case, in which a large *vomica* was found after death in the upper lobe of the left lung.

He therefore admits, that there is a certain limit to the application of the derivative measures here recommended. He allows even that the irritation of moxa especially may be more injurious in certain irritable subjects than beneficial. At the same time we believe the derivative method, whether by issue, moxa, or seton, to be most effectual in removing the symptoms of pulmonary consumption.

The method now recommended, though associated by the author with pathological principles somewhat new, is not in itself original. It was recommended both by Hippocrates and by Celsus. By Coelius Aurelianus* the practice is mentioned as common under the name of *dropaces* or the mild revellent, and *paroptesis* or the severe; and from the testimony of the same writer it results that Themison, the Roman physician, was very much in the habit of ordering large ulcers externally with the view of healing those of the lung. *Paroptesis* or roasting by the cautery appears to have been a favourite remedy.

In modern times the same class of applications has been highly commended by various authors, Baglivi, Hoffmann, and Bennett. Pouteau is a decided advocate for the actual cautery. But by no one has greater confidence been placed in this remedy than by Mudge, who, from the benefit derived in his own person by the use of a large caustic issue between the shoulders, recommended it as a cure almost infallible in cases of chronic *bronchitis* and pituitous or even tubercular consumption.† The same remedy was much used by Dr Carmichael Smyth, and is recommended by his friend Dr Stark. One decided case of recovery only have we seen effected under its use; but in others, so much irritation and suffering has been produced, that we regard it as a remedy by no means generally applicable.

For the preparation of the moxa, we perceive the present author recommends the delicate lint-like pith of the *Urtica urens*, or common stinging nettle, immersed in a solution of nitre. Any combustible vegetable matter, as cotton, lint, &c. prepared in the same manner, seems to answer indifferently well.

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* Caelii Aureliani Siccensis De Morbis Chronicis, Lib. ii. p. 426 and 428. Edit. Alman. et Almeloveen. Amstelaed. 1709.

† J. Mudge, Radical Cure for a recent catarrhous cough. Edit. Lond. 1779.

M. Schroeder van der Kolk wisely rejects, in the treatment of consumption, the idea of specific remedies, and equally condemns sugar of lead, Peruvian bark, and sulphate of quinine; but he thinks the magistery of bismuth, (dinitrate) with Dovers' powder, not a bad medicine.

At the close of his paper, he enters on the consideration of the question as to the distinctive nature of syphilitic consumption, and illustrates the subject by a case, in which recovery took place under the use, first, of calomel and opium, afterwards acetate of lead and opium with ipecacuan; and latterly, the use of decoction of sarsaparilla.

Some observations on the florid and pituitous consumption follow. These the author justly regards dependent on chronic suppurative inflammation of the bronchial membrane. The observations, though useful to his countrymen, contain nothing very original to the English practitioner, and, indeed, he recommends for full information the essay of Dr Hastings.

We would now willingly enter on the consideration of the other remaining subjects, treated by M. Schroeder van der Kolk. But in our anxiety to do justice to his merits in the department of the Pathology of Tubercular Consumption, and to communicate a clear and instructive account of his researches and deductions, we feel that we have drawn very largely on the indulgence of our readers. Here, therefore, regard for the patience of our friends, requires that we make a temporary pause; and we do so in the hope of resuming, at an early season, the consideration of the other subjects investigated by the author. This must be regarded as a sufficient proof of our sense of his merits and his services to the cause of pathological inquiry; and we trust that the testimony, though late, will be not less effectual.

DAVID CRAIGIE.

ART. IV.—*Practical Examinations on the Immediate Treatment of the Principal emergencies that occur in Surgery and Midwifery, systematicaly arranged. Intended to serve as an exercise to the Student, and a brief work of reference for the general Practitioner.* Part the First, by W. S. OKE, M. D. an Extra-Licentiate of the Royal College of Physicians in London. London, 1831. 8vo, pp. 250. Part the Second, by the same. London, 1835. 8vo. pp. 167.

WE delayed giving any account of this work, till the appearance of the second part, by which it is completed, should enable us to do so in a more satisfactory manner, than it is possible to do from the examination of one part only.

The task which Dr Oke has undertaken, though humble, is one which is neither unimportant nor free from difficulty. It is to provide the advanced student and the general practitioner with instructions on the distinctive nature, peculiar effects, and appropriate treatment of those diseases, accidents, and injuries, which demand the management of the surgeon or obstetric practitioner,—sufficiently clear and precise to enable him to act with decision and promptitude in any given case of difficulty.

Dr Oke very properly remarks, that the country practitioner is placed in circumstances very different from those which environ the practitioner in a large and populous city, where the division of labour is more or less generally recognized, and more or less strictly enforced. In the country the duties of the medical attendant are not only multifarious, embracing every department of the profession,—medical, surgical, obstetric, medico-legal, ophthalmic, and acoustic; but they may be extremely urgent, and require not only skill and experience, but great promptitude and decision. A practitioner, in such circumstances, therefore, requires to have all his practical knowledge and resources in the greatest possible readiness, and capable of immediate application. For this purpose, he naturally labours to collect and arrange all those important portions of information, which his knowledge and daily increasing experience with the emergencies of practice, tell him are most likely to avail him. These he must either arrange in his mind, and go over so repeatedly, as to render them perfectly familiar; or if he finds they are too numerous and complex for this, he aids his memory by arranging them in writing, in such a short and compendious form, as may render them at all times easily accessible and susceptible of application. We know several practitioners even in towns, who find it their interest to keep up many parts of practical importance in the manner now mentioned.

This is very nearly the kind of publication compiled by Dr Oke. Without studying to give a full systematic account of diseases, or accidental injuries, which are understood to be the object of the more comprehensive treatises, he presents concise explanations, such as may be easily remembered, of the moft essential facts, pathological, semiographic, and therapeutic, which it is requisite to bear in mind. On these he states in general the views of the highest and most respectable authorities; and in all doubtful points he adduces the doctrines and experience of several different surgeons, and especially those to whom the profession look for the settlement of difficult, obscure, or complicated questions.

The chief sources which the author employs in the manner now mentioned, are, on surgical diseases and accidents, the writings and published lectures of Sir Astley Cooper, the writings of Sir Benjamin Brodie, Sir Charles Bell, Mr Travers, Mr Lawrence, Mr Guthrie, Dr Hennen, Mr Samuel Cooper, and Mr Hammick.

In the department of midwifery and the diseases incident to pregnancy and parturition, he follows chiefly Dr Denman, Dr Burns, and Dr Clark.

The method of arrangement observed by the author is chiefly a variety of the anatomical. He begins with the surgical diseases and accidents incidental to the head and spine, then treats of those of the face and neck, then of those of the chest, its walls and its contained organs, next of those of the abdomen, and its organs, and lastly, of those of the pelvis and its organs,—including pregnancy, parturition, and its effects. The explanation of these subjects occupies the first part.

Dr Oke treats next, in the second part of his work, of the surgical diseases and accidents liable to happen to the extremities, and the various operations required to be performed on them.

The author has contrived, in treating these subjects, to communicate much instruction in an interesting manner. It must not be understood that the book will supersede the study of more full and comprehensive treatises. This is not the intention of the publication. It requires to be preceded by the perusal of some systematic work. It will, however, be of much use after the study of such a work, in refreshing the memory and methodizing the knowledge of the student, and directing his attention to essential points which it is absolutely necessary for him to bear in remembrance.

ART. V.—1. *Akiurgische Abbildungen oder Darstellung der Blutigen Chirurgischen Operationem,* u. s. w. *Akiurgical Figures, or Representations of the Bloody Surgical Operations, and the Instruments devised for their performance, with Illustrative Text.* By Professor Dr ERNST BLASIUS. Berlin, 1833. Folio, 50 Plates.

2. *Erklarung der Akiurgischen Abbildungen oder der Darstellung der Blutigen Chirurgischen Operationem,* u. s. w. By Dr ERNST BLASIUS, Professor in the University of Halle. Berlin, 1833. 4to. Pp. 222.

MANY good surgeons, some the ablest which have belonged to the body, have repeatedly expressed the sentiment, that the operating department is that which makes them feel most keenly, if not the inefficiency of the art, at least the mortification of having recourse to mechanical means for removing what they know not how to cure.

The performance of an operation is in general an acknowledgment of incapacity to rectify the disease or injury by the powers of the system, and, at all events, is an admission, that no means are known by which we can cure the disease, without removing the affected parts, or mutilating the patient. It is for this reason that all good surgeons have always regarded it as most completely fulfilling the object of the art, rather to prevent than to perform an operation, and have studied to discover such means as might tend to remove the disease, without removing the parts in which it is seated, and to cure rather by physiological than by mechanical measures. Such means have been emphatically denominated the natural surgeon; and, however humiliating it may be to human ingenuity, it must never be forgotten, that the surgery taught and practised by surgeons is perfect or imperfect, good or bad, in proportion as it approaches the methods pursued by nature. In this point of view, all instrumental surgery must be regarded as evidences of the imperfection of the art, and as proofs that surgeons have not yet arrived at that degree of excellence in surgical pathology, in which it is to be hoped, they might possess means to enable them to prevent the necessity of operation.

On the principles now stated the present publication constitutes a sort of practical commentary. It presents the surgeon with the means to which he must have recourse when his knowledge of the resources of the economy can no longer avail him. He takes leave of philosophical and physiological principles, and has recourse to those which act mechanically. In this spirit the author appears to have made choice of the term by which he Designates his work,—Akiurgical delineations or Delineations of Cutting Instruments, in other terms, Operative or Instrumental surgery. The work, indeed, presents a view of all the mechanical contrivances employed in the practice of surgery, and of all the instruments which have been devised by different operators for aiding them in the performance of operations. From the operating table with its apparatus of movable heads, screws, racks, rings, and bolts, to the limb, when it is dressed and enveloped in the appropriate bandages, bound to the splint, or locked in the cradle or fracture-box; from the lancet or bistoury, and the manner in which each ought to be held, to the amputation knife, the gorget, and the lithotomy knife; from the simplest straight saw to the complex chain saw, and the trephine; forceps, nippers, *cannulae* of every size and description; every utensil, in short, required or likely to be required by the surgeon is here represented.

These figures of so many singular instruments are calculated to give the work an appearance both formidable and something repulsive. The multiplicity of instruments devised for the various operations on the eye, which amount to 231, and occupy three plates, the long and varied array of instruments required for the operations on the head and face, and its cavities, and the numerous forms which have been given to the instruments required in the operation of cutting into the urinary bladder, and extracting the stone, are calculated rather to dishearten the surgical student.

If, however, this publication, by exhibiting instrumental surgery in its most complicated, formidable, and repulsive character, may damp the ardour of the surgical aspirant, it is also, by presenting all the various forms with which instruments have been endowed, useful in showing the surgeon the very height of the evil which he has to encounter. By placing before him such numbers and varieties of instruments, it may enable him to choose that which, upon mature consideration, seems best calculated for the proposed purpose.

It must not be imagined, however, that, though the work of Professor Blasius is devoted to instrumental surgery, it contains nothing but figures of instruments. Though in this particular it resembles the ancient and almost obsolete treatises of Scultetus, Purmann, and Heister, it contains representations of subjects much more important than mere instruments, and much more useful and necessary than either the form or the number of instruments.

Professor Blasius undertakes to present in it a full and complete view of operative surgery; and this we must say he has not only accomplished most successfully, but we believe that his work is not only original in plan, but, for minuteness, accuracy, and extent of information, is quite unrivalled.

The arrangement of the work, and some idea of its nature and contents, will be understood from the following account.

The great object of the author is to explain the method of performing the different operations, to describe the different instruments used in performing them, and to instruct the student in the use of the instruments.

With this object in view, the author begins, first, with the generalities of instrumental surgery, as the operating table, and such simple instruments as the lancet and trocar, the scalpel, the hook, the forceps, the scissors, the bone-nippers, saws, and hammers;—all exhibited in two plates.

Professor Blasius then proceeds to special instrumental surgery, as needles and sutures; dilatation of wounds, and the instruments required for that purpose; the extraction of foreign bodies; scarification and cupping; venesection and arteriotomy; ligature of blood-vessels; torsion of arteries; the operation for aneurism; infusion, transfusion, inoculation, cauterization, introduction of the seton, opening of abscesses, division of nerves, and acupuncture.

He then represents the different operations to be performed on the eye and its appendages, and the various instruments employed in performing them; next the operations required on the head, the face, and its cavities. He then explains the operations required in the throat and neck, as bronchotomy and œsophagotomy, and extraction of foreign bodies from the *œsophagus.* Next come excision of the *mamma*, *paracentesis* of the chest, and the treatment of wounds of the chest, with the suppression of hemorrhage from wounds of the intercostal arteries. Under the sixth division are placed the operations to be performed on the abdomen, as *paracentesis*, gastrotomy, and dilatation of wounds of the belly; the operation for the different species of hernia, the operation for artificial anus, that for *fistula ani*, and that for *prolapsus ani.* Professor Blasius then proceeds to catheterism, puncture of the bladder, lithotomy in every mode and fashion, in which that operation has been performed,—high, lateral, and bilateral, and recto-vesical,—by the knife, lithotome, cystotome, and gorget, and in males and in females; to the operations for polypi of the urinary bladder, strictures of the urethra, *phimosis*, amputation of the penis, hydrocele, castration, the Cæsarean section, synchondrotomy, the operation for uterine polypi, excision of the womb, and the operation for vesical *fistula.*

In the last department of his work, Professor Blasius describes the various amputations and disarticulations performed on the extremities.

In treating these subjects successively, though the views and descriptions of the instruments, and the directions for the method of using them, are extremely useful, they are in our opinion by no means either the most important or the most interesting part of the work; and we acknowledge that, for this department alone, we should not have thought it necessary to recommend the work to the English surgeon.

The part of the work of Professor Blasius which must be regarded as most directly fulfilling the object, in communicating useful instruction to the student, is that of the anatomy of the various surgical operations, and the exhibition of the successive steps of which each operation consists. Not only has Professor Blasius given views of the modes of inserting sutures, applying ligatures to arteries, to tumours and to polypi, of introducing *cannulae*, forceps, staffs, and catheters; but he presents accurate delineations of the surgical anatomy of every operation requiring to be performed on the human body, describes minutely the steps of each operation, and gives views of the proper position and direction of the instruments employed.

The relative position of all the arteries likely to require to be secured by ligature, with the parts at which the incisions ought to be made, which are given in Plates sixth, seventh, eighth, and ninth, constitute a series of instructions of great value to the surgeon. The operations on the eye and its appendages are exhibited with equal perspicuity, in the eleventh and fourteenth plates. A very amusing view of the rhinoplastic, or nose-making operation, is given in the nineteenth engraving. The parts concerned in oesophagotomy and bronchotomy, and those concerned in wounds of the thorax, are exhibited in the twenty-eighth plate. The surgical anatomy of the different forms of hernia are very well represented in the 32d and 33d engravings; and in the 34th are given the parts concerned in *fistula ani*, artificial anus, prolapsus, introduction of the catheter for retention of urine, and puncture of the bladder.

Most full and satisfactory views of the anatomy and surgery of lithotomy, in its different fashions, are presented in the 40th, 41st, and 42d plates; and the author, that his pupils may understand this operation thoroughly, gives views of the different incisions, and of the direction in which the instruments ought to be introduced, with representations of the actual position when introduced. In the same plate is seen that frightful operation, excision of the *cervix uteri*, with the instruments applied.

Lastly, Professor Blasius represents the varieties of amputation, with the appearances of the stumps, and all the vessels, previous to the application of ligatures and the requisite dressings, on their surface. These views have the advantage of those of Maingault, in imitation of which they are made, in being considerably more distinct, and, so far as we can judge, more vividly after nature. They will be highly useful in enabling the young surgeon to perform his amputations in the most accurate and precise manner, so as to insure the formation of a neat and serviceable stump.

The explanatory descriptions, by which these illustrations are accompanied, show extensive and accurate knowledge of the literary history of operative surgery. All the operative methods and their peculiarities are carefully explained; and whoever studies this work cannot fail to understand thoroughly the merit of the different methods proposed for accomplishing each operation. This leads us to think that a republication in this country, with a translation of the explanatory details, would be extremely useful; and, in such circumstances, the number and variety of the instruments represented might be greatly diminished, while the anatomical figures and the views of operative processes might be retained.

PART III.

MEDICAL INTELLIGENCE.

MEDICAL PATHOLOGY.

Morbid Anatomy of the Lungs in Tubercular or Pulmonary Consumption. By WILLIAM STARK, M.D. From Posthumous Works, Lond. 1788. —*Appearance of the Lungs in the Pulmonary Consumption.*—*Tubercle.*—"In the cellular substance of the lungs are found roundish firm bodies, (named tubercles) of different sizes, from the smallest granule, to about half an inch in diameter; the latter often in clusters. The tubercles of a small size are always solid, even those of a larger are frequently so; they are of a whitish colour, and of a consistence approaching nearly to the hardness of cartilage; when cut through, the surface appears smooth, shining, and uniform. No vesicles, cells, or vessels are to be seen in them, even when examined with a microscope, after injecting the pulmonary artery and vein. On the cut surface of some tubercles were observed small holes, as if made by the pricking of a pin; in others were found one or more small cavities, containing a thick white fluid, like pus; at the bottom also of each of these cavities, when emptied, several small holes were frequently to be seen, from which, on pressing the tubercle, matter issued; but neither these holes nor the others above-mentioned, (so far at least as could be determined) communicated with any vessels. The cavities, in different tubercles, are of different sizes, from the smallest perceptible, to half an inch, or three quarters of an inch, in diameter; and, when cut through and emptied, have the appearance of small white cups, nothing remaining of the substance of the tubercle, except a thin covering or capsula. The cavities of less than half an inch diameter are always quite shut up; those which are a little larger have, as constantly, a round opening made by a branch of the trachea. At this period, there being a free passage for the matter contained in the tubercle into the trachea, and a communication between the cavity of it and the open air, it is proper to change the name of tubercle to that of vomica.

"*Vomica.*—The smaller vomicæ are commonly entire, the larger are frequently ruptured; the largest (which, generally speaking, are of an oval shape, and about four inches in length,) are lined, either partially, or entirely, with a smooth, thin, tender slough or membrane; the same as the capsula of the smaller vomicæ. The matter contained in them, when the capsula is entire, is whitish or yellowish; when ruptured, reddish; in either case readily diffusible in water. It is proper, however, to remark, that even in the largest vomicæ, when they are not completely ruptured, the matter is seldom red, but yellowish, ash-coloured, or greenish; often fœtid.

"Into all vomicæ (the smallest perhaps excepted) there are several openings of the bronchia; also openings forming communications between the different vomicæ: the bronchial openings are commonly round and smooth; the others generally irregular and ragged. The larger vomicæ, which have numerous bronchial openings, are found to contain scarcely more matter than is sufficient to besmear their surface; and what shows clearly that the matter of vomicæ is discharged by these openings of the *aspera arteria*, is, that if a deep incision be made into any diseased part of the lungs, and that part gently compressed, the matter will be seen to issue from the cut extremities of the bronchia; or if any considerable branch of the *aspera arteria* be laid open, and the lungs pressed in the same manner, the matter will be seen coming into it, from the smaller ramifications.

"The largest vomicæ are generally situated towards the back part of either upper lobe, and are commonly concealed; though sometimes on the surface of that part of the lungs, which is thin and sinks into a hollow, there are several small apertures leading to the vomica; and sometimes, though rarely, a vomica is a hemispherical cavity on the outward part of the lungs. Wherever there is a vomica, there is always a broad and firm adhesion of that part of the lungs to the parietes, or pleura, so as to preclude all communication between the cavity of the vomica and that of the chest; even tubercles are seldom found without adhesion.

"*State of the Air Vesicles and Cellular Substance.*—Those parts of the lungs which are contiguous to tubercles are red, sometimes soft, but more frequently firm or hard; and whilst other parts of the lungs unaffected by disease are readily distended, by blowing into the trachea, those portions which are contiguous to tubercles or vomicæ, remain depressed and impervious to air, either blown into the lungs in this manner, or forced, by a blowpipe, into incisions made on the surface. So that the function of the lungs, so far as respects the admission of air, seems, in those parts, entirely destroyed.

"*State of the large Blood-Vessels.*—The pulmonary arteries and veins as they approach the larger vomicæ are suddenly contracted; a blood-vessel, which, at its beginning, measured nearly half an inch in circumference, sometimes (though it had sent off no considerable branch) could not be cut up farther than an inch; and when, outwardly, they are of a larger size, yet, internally, they have a very small canal, being almost filled up by a fibrous substance; and frequently, as they pass along the sides of vomicæ, they are found quite detached, for about an inch of their course, from the neighbouring parts. That the blood-vessels are thus obstructed, and that they have little or no communication with the vomicæ, is rendered still more evident, by blowing into them, or injecting them. By blowing they are not sensibly distended, nor does the air pass into the vomicæ, excepting very rarely, and then only by some imperceptible holes; and, after injecting the lungs by the pulmonary artery and vein, the parts, less affected by disease, which before injection were the softest, become the hardest; and, *vice versa*, the most diseased parts, before injection the hardest, are now the softest. Upon cutting into the sounder parts, numberless *ramuli* may be seen, filled with the wax; but in the diseased parts there is no such appearance; and upon tracing, by dissection, the injected vessels, those which terminate in the sounder parts may be traced for a long way to the smaller *ramuli*, but those which lead to tubercles and vomicæ, a very short way, and only to their principal branches. The wax was very rarely found to have entered the middling sized vomicæ, and never the smaller or larger ones.

"*Trachea.*—The branches of the trachea are never found in any degree contracted; the internal surface of those which opened into the large vomicæ, was of a deep red, (seemingly from the enlargement of vessels) and the internal surface of the trachea itself was sometimes partially red.

"*The Degrees of Morbid Affection.*—The degrees of morbid affection are very different, in different subjects, and in different parts of the lungs of the same subject. In some cases there are no vomicæ to be found above an inch in diameter; in others, several of two, three, or four inches. In the former cases, the pulmonary arteries and veins are hardly sensibly contracted. Sometimes not above a third or fourth part of the lungs are affected; at other times, the lungs, of one or both sides, are entirely diseased. From a rude calculation made on diseased lungs, the part which remained fit for the admission of air may be estimated, at a medium, to be about one-fourth of the whole substance of the lungs. When the lungs are only partially affected by disease, the diseased parts are always the higher, and rather the posterior; whilst the sound parts are the lower, and rather the anterior. When they are wholly diseased, the higher and posterior parts are always much more so than the rest; and the lungs of the left side are more commonly affected than those of the right.

"The lymphatic glands in the chest are frequently blackish, and sometimes contain a substance like moistened chalk. In the abdomen there is not any thing remarkable, excepting, sometimes, slight erosions of the villous coat of the intestines."

MEDICAL THERAPEUTICS.

On the Simple Antiphlogistic Method of treating Syphilis. By M. Devergie, Senior Surgeon-Major to the Military Hospital of Gros-Caillou (Archives Generales de Medecine, &c. ii. series, Vol. ix. Nov. 1835, concluded from last Number.)—The mean duration of treatment employed for the removal of simple or complicated, primary or secondary, symptoms varies from twenty-eight to thirty-two days.

The same result was obtained by M. Desruelles of the Val de Grace in about 2000 venereal patients, treated by the same method in the hospital, and in the appendage in Rue Blanche, between 1825 and 1834; whereas the mean duration of treatment in patients subjected to the use of mercury by the same practitioner was fifty days.

The same result was obtained in 700 venereal cases treated by M. Barthelemy of Saumur, at the same establishment in 1833.

M. Villars, Chief Surgeon to the Military Hospital of Besançon, obtained an average of thirty-seven and a half days by the simple treatment in 740 cases and fifty days by the treatment by mercury.

M. Desruelles Senior, and M. Rapatel, obtained at the Military Hospital of Rennes the following results from the two methods. In 1827, 1828, and 1829, 1187 cases of primary symptoms treated by the simple method gave a mean duration of thirty-four days; 378 cases of primary symptoms treated by mercury, took an average duration of fifty-nine days; in the succeeding eighteen months (1830, 1831) 876 venereal cases subjected to the mercurial treatment occupied a mean duration of twenty-nine days, whereas forty-eight cases treated by mercury occupied an average of eighty-one days.

The same advantages were obtained at Strasbourg in the treatment of 4000 venereal cases by M. Keyser, who, for a space of eight years, has effected an important modification in the treatment of syphilis in an hospital in which M. Richonde began successfully in 1822 and 1823 his comparative trials upon 2000 venereal cases.

At Algiers, M. Flèchutt, Surgeon Major to the Military Hospital of the Dey, has treated by the method with similar results, 5000 between 1831 and 1835.

Notwithstanding the evidence of these facts M. Lepelletier of Mans, M. Girardin, and M. Moreau have advanced regarding the injurious or the inefficient result of the simple non-mercurial treatment, various assertions, which M. Devergie maintains to be unfounded, and therefore controverts.

1. M. Lepelletier states that, at Mans, he treated by mercury many soldiers labouring under primary symptoms, *all of whom recovered, nor did one enter the hospital on account of relapse,* while the soldiers sent to Rennes, where the treatment without mercury was observed, returned frequently with constitutional syphilis. He counted, he states, *about eighty cases.*

This assertion is declared by M. Desruelles of Rennes to be unfounded, and in proof he adduces the following statement.

348 venereal cases were treated at the Hospital of Mans, between 1829

and 1834, by the mercurial method, and all were cured, according to the statement of M. Lepelletier, without relapse. 226 venereal cases from the same regiments were at the same time sent to the military hospital of Rennes. 199 were cured by the simple treatment, and 26 by means of mercury. 7 only of these soldiers entered the hospital of Mans for relapses and *sequelæ*, and not 80, as stated by M. Lepelletier; while 31 patients treated at Mans, by means of mercury, entered the hospital at Rennes, for relapses and consecutive symptoms.

M. Girardin stated to the Academy, that at Strasbourg, where the military physicians were the foremost to denounce mercury, they equally soon recognized the inefficiency of mere antiphlogistic means. But as they dared not return to the banished remedy, they had recourse to iodine, thus substituting one specific for another.

This statement is refuted by M. Keyser, of Strasbourg, who writes, that he could easily prove the very small number of relapses, by the long residence of the artillery regiments in the garrisons; that more than two years have elapsed since he has seen any diseases of the bones, which he ascribes to withholding mercury, or limiting, to a infinite degree, the use of mercurial medicines; and that it gives him surprise to learn through the Academy, that the simple treatment had been so unsuccessful, that it was requisite to give it up, and that iodine had been substituted in its place.

3. M. Moreau states that *cases of hereditary syphilis have been seen only since the antiphlogistic* method has been generally employed.

This assertion, M. Devergie maintains, falls to the ground by its own weight. The simple method is still confined in France, within a certain circle, including several military and some civil hospitals, and is adopted by few physicians. Syphilis also, he adds, cannot be transmitted unless after a long lapse of time, and consequently it must have been impossible yet to obtain the results represented to have been obtained by M. Moreau; and lastly, relapses are much less frequent and less severe since the general employment of the antiphlogistic method.

If the mean duration of the rational treatment employed regularly since 1821, in different hospitals, be compared with that required by the mercurial treatment, still actually employed at present, an enormous difference is recognized. At the Val de Grace the average was in the following proportion.

		Patients,	*Days.*
1821,	-	872	71
1822,	-	797	60
1823,	-	406	63
1824,	-	1338	60
1825,	6 months,	505	56

The progressive diminution observed in the latter years is to be ascribed, M. Devergie thinks, to the modifications which he introduced into the practice of the hospital, where he was attached in the capacity of adjunct-surgeon-major.

A serious objection urged by the opponents of the simple rational method is, that it does not prevent relapses, which are frequent, and that the secondary symptoms are numerous. This objection, M. Devergie maintains, is urged only by those who have imperfectly examined the question, and the decision is not confirmed by experience, but merely favoured by a few isolated facts. The change of garrison, which does not allow the same troops to remain at Paris beyond two years, renders it impracticable to obtain exact numerical returns. The great number of venereal patients, however, who enter the hospitals, shows that the charge is exaggerated, and proves that the cases of relapse and secondary symptoms do not exceed in Paris the number published by the Sanitary Commission of Sweden, which is from 7 to 8 *per cent.* while they amount to 14 *per cent.* under the ordinary mercurial treatment. Relapses, when they do occur, he maintains, are shorter in duration, and milder in degree.

Neither M. Devergie, nor any of those practitioners who have joined him in giving the simple method a full trial, have denied the occurrence of relapses. M. Desruelles gives a list of 38 patients who had been readmitted into the Val de Grace and at Picpus, during 1827 and 1828; M. Richond at Strasbourg, mentions a twentieth part as cases of relapses; M. Keyser of the same hospital allows a few took place; and M. Fleschutt of Algiers admits 173 in 5000 venereal cases treated. There the regiments are changed only every four years, like the artillery, which remains from five to six years in the same garrisons at Strasbourg, Rennes, Paris, &c.

The table of M. Desruelles gives the following comparative numbers of relapses in cases treated by mercury, and in those treated without that mineral. 29 relapses after treatment without mercury, employed by the same means, only 39 days, while 7 relapses after treatment without mercury, then subjected to the mercurial influence, required 73 days. 26 relapses after mercurial treatment recovered under the simple treatment in 35 days, while 6 relapses after the same mercurial treatment required a mean of 113 days, being treated anew by means of mercury.

M. Devergie makes the following general statements on the therapeutic effects of the method.

1st, Relapses in cases treated by the simple method are less numerous and less severe than those which follow the mercurial method. *2d,* They recover more easily, and rarely require the employment of energetic means. *3d,* The wards no longer contain those degenerated forms of disease termed *pseudo-syphilitic,* the result of the abuse of mercurial medicines in every shape, obstinately and lavishly administered to destroy and neutralize the virus; while we still find unfortunate examples in the practice of physicians, who know no other means than mercury for curing degenerated diseases, and the civil and military hospitals still receive deplorable victims of the abuse of this mineral. *4th,* The affections from the provinces of the fibrous and osseous system are so much diminished, since the use of mercury has been restricted, that scarcely are any instances met in the wards. M. D. estimates them at 1 in 500 cases.

Against those who contend for the employment of mercury in the treatment of venereal diseases, the following arguments may be urged:

1st. That mercury is very far from always curing syphilis; *2d,* That it prevents neither relapses, nor secondary symptoms; *3d,* That the secondary symptoms are then more obstinate, more severe, and require longer time to be subdued; *4th,* That there is formed in certain patients a pseudo-syphilitic diathesis, which is still further aggravated by perseverance in the same remedies; *5th,* That it induces mercurial diseases or severe and incurable disorders; and *6th,* That many other therapeutic means are capable *alone* of curing venereal disorders, without the aid of mercury.

M. Devergie does not, however, while he advocates the employment of simple rational means, propose to exclude mercury altogether from the therapeutic agents for the syphilitic disease. However apprehensive of its perturbing effects, he allows its restricted employment, when other means are inadequate. Some of his patients have used it, not as a specific, but as a powerful modifying agent. And it is his opinion that it is rational to regard the simple method as a general one, and to administer more powerful modifying agents only in the exceptions.

The simple mode of treatment, he also observes, furnishes the only means of drawing an exact comparison, and enabling us to distinguish between the effects of syphilis and those of mercurial medicines.

The treatment pursued by M. Devergie may be distinguished into the following heads.

1. *Regimen.*—Light soups oftener lean than fat, with bread and grains, milk in different forms, ripe fruits, baked, eggs, and the leguminous grains, seldom meat and fish, bread varying in quantity, according to the necessity of a regimen more or less rigorous; no wine or malt liquor, unless upon the disappearance of the symptoms and during convalescence.

2. *External Treatment.*—This varies according to the form of the disease; but in general it is the simplest possible. Fomentations, emollient poultices, local or general baths; local blood-letting by means of leeches, the simple or opiate cerate, the simple or concentrated solution of opium, seldom the discutient poultices, often the temporary blister and the antimonial ointment,—form the basis of this treatment.

Rest, even confinement to bed, is particularly recommended. It is indispensable to patients attacked with glandular inflammation or ulceration, with phagedenic ulcers, with exostoses, with pains, &c.

3. *Internal Treatment.*—Few purgative medicines, unless with patients whose digestive tube is sound; emollient oily laxative or purgative glysters; and general blood-letting when the symptoms are inflammatory.

4. *Drinks.*—They must be selected from the class of light, diluent fluids, decoctions of barley, liquorice, linseed tea, solution of gum, lemonade, milk and water, thin soup, &c.

These means are useful not only in opposing the primary symptoms. They are equally beneficial in the treatment of simple or mercurial secondary affections, though they require being modified according to circumstances.

Treatment of particular Symptoms of Syphilis.—Inflammation of the glans (*Balanitis*) requires merely local cleanliness. It is seldom complicated, and it becomes well in the course of from six to twelve days.

Posthitis, or inflammation of the inner surface of the foreskin, considered by M. Desruelles, as a complication of inflammation of the *glans*, and more frequently with ulcers, sometimes with urethral inflammation, especially in men with narrow preputial aperture, or addicted to the abuse of spirits, often causes acute or chronic accidental *phimosis* or *phlebitis*.

General blood-letting M. Devergie regards as preferable to the application of leeches, which, applied to the excessively inflamed prepuce, might produce gangrenous points or ulcerations. Diet and rest are indispensable; tepid lotions, fomentations, and emollient injections slightly narcotized, useful. Leeches, if requisite, ought to be applied to the *perinæum*, the groins, and the *pubis*. The treatment is completed by resolvent applications.

Accidental Phimosis is acute, complete, or incomplete, or œdematous. It is always caused by inflammation of the prepuce and *glans* (*posthobalanitis*,) by ulcers of the *glans*, of the prepuce, by vegetations, and by acute urethral inflammation. The treatment varies according to the form.

The œdematous *phimosis* yields to astringent applications.

The inflammatory *phimosis*, if it resist the antiphlogistic treatment, rest and low diet, must be rectified by operation. The proceeding of M. Cloquet, which is as expeditious as others, and has the advantage of leaving no deformity after the operation, is preferred by M. Devergie. It consists in introducing a grooved sound into the preputial cavity, on a level with the *frenum*, and parallel to this membranous fold, and slitting the prepuce at its lower region. When the *frenum* is too short, it is divided by scissors.

Accidental *phimosis* after operation, treated by the external method, always heals a great deal more rapidly than by the rational method.

Inflammation of the parts forming the *penis*, as *phlebitis* of the dorsal veins of the penis, swelling of its lymphatic vessels, and abscesses in the substance of the penis, all demand simple treatment, and readily disappear without recurring, and without the employment of modifying agents.

Acute urethral inflammation (*urethritis*) actively treated by several applications of leeches along the canal and in the *perinæum*, aided by rest, general and local baths, diluent drinks, cold lotions at the first, subsides pretty rapidly. Balsamic potions, with aromatised turpentine, or a few doses of the balsam of copaiba, complete the treatment, which varies from fifteen to twenty or thirty days.

Chronic urethral inflammation, without pains, requires the employment of astringents, general and local, the dose and strength of which vary according to the constitution and idiosyncrasy of the patients;—cubebs, the potion of Chopart, copaiba in white wine, &c. Injections consisting of opium and acetate of lead, wine and water, chlorine water, &c. are used in moderation. Injections consisting of sulphate of zinc even in weak doses are less frequently employed to avoid swelling and contraction of the urethra, so common after local astringents.

Urethral inflammation produced by stricture, is treated by simultaneous cauterisation and dilatation, or by scarifications; but still preferably by the forced catheterism according to the method of M. Mayer.

Inflammation of the bladder (*cystitis*) acute or chronic, requires the treatment to be varied according as the symptoms are more or less severe. The treatment for the acute state is well known. The chronic state, with abundant mucous discharge, M. Devergie successfully treats by injections of copaiba, less frequently by a weak solution of nitrate of silver.

Orchitis in the acute state yields readily to blood-letting, at first general, then local, to emollients and laxatives.

Chronic *orchitis*, whatever be the size or state of the tumour, subsides under the following treatment. Local bleedings, hemlock with calomel, one part of the former to three of the latter, or pills of four grains each, given progressively from one to ten daily. When the gums are swelled it is requisite to act revulsively on the intestinal canal. With this treatment, which has been long employed at Strasbourg, and at the Val de Grace, where it was adopted by M. Gama, M. Devergie has been invariably successful. If chronic *orchitis* be not very inveterate, he opposes it by moderate local blood-lettings, repeated and alternated with saline oily purgatives.

Gangrenous Inflammation of the Scrotum, often induced under the influence of intense gastro-intestinal inflammation, was very frequent in the civil and military hospitals, where mercury formed the basis of treatment in venereal cases; but it is greatly less frequent where mercury is less lavishly administered. It belongs to the class of ordinary inflammations, and requires no particular treatment.

Ulcers of the Penis and of the Prepuce are in general all cured, whether simple or multiplied, in the course of from twelve to twenty-five or thirty days, by the rational method; while almost invariably they occupy under the mercurial treatment from twenty-five to forty days.

Emollient lotions, sometimes narcotized, baths local and general, low diet, the simple or opiate dressing, suit best in the first period. Subsequently lotions with vegeto-mineral water, solution of sulphate of copper, and slight applications of the nitrate of silver, complete the cure. These applications ought to be employed only every second day, always slightly and cautiously. M. D. states, that he cannot refer to six patients annually to whom he has given mercurial preparations.

Chancres are healed with recurrence at the rate of from 85 to 90 per cent.

The cure of ulcers of the penis is often retarded by complications.

Phagedenic ulcers require prompt measures to act on the constitution, which is generally disordered previous to cohabitation or after contagion. In twenty-eight days ulcers of this species yield to simple treatment, to low diet, leeches applied to the ulcer, and solution of opium. Others have required from thirty-five to forty-five days; while by the mercurial and sudorific treatment the cure has taken place only at the end of fifty or sixty-five days. In some cases, however, in which the cure must have been tediou in patients not restricted to regimen, he allows that he accelerated the cure by mercurial frictions near the seat of the disease, and more readily by means of calomel.

Two patients of this unmanageable character were attacked in the hospital with secondary ulcers of the tonsils, for which sudorifics and mercurial frictions were employed.

Acute glandular inflammation (*Adenitis*) often complicates ulcers in soldiers and working-people who do not observe rest and low diet. The swellings are more difficult to cure, according as they are *supra* or *infra*-aponeurotic, and as the digestive canal is in an unhealthy state. The treatment consists in perfect rest, local and general baths, general and local blood-lettings according to the intensity of the symptoms, emollient fomentations, then narcotic applications. The regimen varies from low diet to moderate food, most frequently vegetable. It is more eligible to repeat the application of leeches than to apply many at once, in promoting resolution.

If suppuration cannot be prevented, the inflamed gland must be promptly opened in the direction opposite to the fold of the groin, to avoid sinuses.

When the skin is bluish, livid, or thin, it is best to open the abscess by the caustic potass.

Cases of glandular inflammation treated by the simple method are rarely followed by secondary local accidents, as sinuses, fistulous passages, profuse suppuration, phlegmonous erysipelas, &c. On the contrary, it is not uncommon to see these accidents developed during mercurial treatment in damp wards, in patients predisposed, and to render the cure long and difficult.

When hypertrophy of the lymphatic glands causes them to project through the aperture in the skin, local bleedings often abate the enlargement, when they may be more completely reduced by burnt alum, sulphate of copper, or nitrate of silver. In the opposite case, excision in successive portions or entire, lozenges of red lead, or the repeated application of potass in powder, is the best means, aided by low diet.

Indolent or chronic glandular inflammation, either primary or secondarily acquired, he treats by means of local bleedings at first, then, in order to attempt resolution, by iodine preparations, mercurial frictions, the proto-ioduret of mercury, the volatile liniment, and, above all, the temporary blister. Of all these means, the latter is represented to be most rarely ineffectual. It sometimes requires to be renewed.

He has also employed comparatively concentrated solutions of bichloride of mercury, of sulphate of copper, of iron, with blisters, without more manifest results than by the blisters alone.

When, under these means, resolution of large indolent tumours is not effected, there remains the resource of the caustic potass applied along the course of the tumour. This produces copious suppuration, which destroys the inflammation of the gland; or every second day four or five leeches may be applied over the exposed glands.

Primary or secondary vegetations, are best and most certainly removed by excision, and then cauterization by a liquid caustic,—a method which he has invariably employed for years. The savine powder is not a contemptible remedy.

If the vegetations be numerous and have large bases, it is requisite to try local mercurial frictions, which sometimes make them decay and hasten their cure. But this is generally true of a small number of cases only. When they resist the means now specified, removal by the bistoury and cauterization are the only means of destroying them.

Vegetations and Excrescences at the verge of the Anus, generally disappear under the use of solution of opium, or fumigations of the black sulphuret of mercury, and slight cauterizations. When they are large, excision, and then the application of the acid nitrate of mercury or the nitric acid, constitute the appropriate treatment. Internal remedies, M. Devergie employs only for vegetations recurring, or complicated with other symptoms, either in the *fauces* or in the skin. He then begins with diluent drinks, low diet, and baths; next orders sudorifics in the shape of ptisan or syrup; and sometimes he has recourse to mercurial preparations when the cure appears to be tedious.

Secondary symptoms, improperly named constitutional, chronic, or mercurial, may all be referred to lesions of the lymphatic, mucous, cutaneous, fibrous, and osseous system.

The treatment of secondary lesions of the lymphatic system varies little from that specified for the removal of primary affections. It is the same as to the treatment of excrescences.

Ulcerations of the mucous membrane of the cheek, nose, bowels, and pharynx, whatever be their seat, their appearance, and their extent, are treated by low diet, slight, often repeated, local blood-lettings, emollients, general baths, and laxatives when the intestines are sound. The powerful modifying agents are not employed, unless the simple treatment pursued for a longer or shorter time have been unavailing. The preferable modifications are sudorifics, subcarbonate of ammonia, baths composed of sulphur, opium, hyoscyamus, &c. In general it is best to increase the action of gargles in proportion to the improvement, to touch the ulcerations frequently with hydrochloride water, solutions of sulphate of copper, nitrate of silver; and he has employed, though rarely, mercurial preparations, to subdue these affections, especially in patients who have already undergone mercurial treatment, without obtaining a cure.

Affections of the cutaneous system. Syphilitic Eruptions, Tetters; unguis; gummata.—As there is neither in the kind of alteration of the skin, nor in the colour, nor in the seat of the eruptions, any circumstance which can certainly determine the cause from which they have proceeded, the simple treatment is the best for first adoption. With this, therefore, and with anodyne oleaginous lotions, M. Devergie always begins; then proceeds to modifications; then to bitters, depuratory medicines, ammonia, sudorifics, gelatinous and sulphurous baths. Sometimes he employs advantageously the bichloride of mercury, when the cure threatens to be tedious.

Gummata, unguis, rhagades.—These symptoms have become so rare since the systematic mercurial treatment has been abandoned, that for three years M. Devergie has seen only one example of *rhagades* after simple treatment.

Affections of the osseous system; syphilitic pains, periostoses, exostoses, caries, necroses.—These disorders he regards in the greater number of cases as the result of syphilis uncured or aggravated by mercury, in persons predisposed to gouty and rheumatic affections. Before having recourse to mercurial preparations, he represents it to be always necessary to employ soothing means of all kinds. Sometimes mercury in liniment with opium succeeds; sudorifics combined with opium or henbane, and subcarbonate of ammonia are mostly used by M. D. In inveterate cases the ptisans of Feltz, Arnoult, or that of Pollini have always succeeded with him.

He adds that, for twenty years, he has employed either in the hospitals or in the city, a sudorific syrup, consisting of *guiac*, *Rumex Patientia*, burdock, *saponaria*, bitter-sweet, and fumitory, in equal proportions.

SURGERY, PATHOLOGICAL AND OPERATIVE.

On the Diseases of the Medullary Tissue, by M. DUBRUEIL, Dean of the Faculty of Medicine at Montpelier, Professor of Surgical Anatomy and Pathology. Communicated by Dr JOHN O'BRYEN. The medullary membrane, by nature cellulo-vascular, is in connection with the external *periosteum;* and like it, and even in a greater degree, in consequence of its greater vascularity, contributes to the nutrition of the bones. Though the deep situation of this membrane places it out of the reach of exterior bodies, yet it is liable to suffer intensely by the compression which, when under the influence of morbid causes, the bony parietes exercise on it. This membrane, distended by liquids, acquires great expansion in immediate contact with the reticular tissue, which it sustains; and is never seriously diseased without the participation of the latter.

1. *Acute Inflammation of the Medullary Membrane of the Tibia, with partial gangrene—deep and extensive Necrosis of the Bone—bony concretions beneath the Periosteum—Amputation of the Thigh, and Cure.*—A servant, aged 20, thin, and of a scrofulous constitution, had, during the first seven years of his life, swelling, with suppuration of the lymphatic glands of the *axilla* and neck. The patient, who lived in Provence, was sent to Toulon for sea-bathing. He had taken successively twenty baths, in spite of the general over-excitement which he felt, and was suddenly attacked with erysipelas in the left leg. An emetic was administered, but without benefit; twenty leeches were applied to the spot, and the antiphlogistic treatment employed. The pain was continued and more intense than is usual in simple erysipelas. The seventeenth day from its invasion, the internal face of the tibia was ulcerated; bony concretions were discovered, separated from one another and covered by the *periosteum.* They were adherent to the bone. The fever, which was continued, now became much increased during the night, with violent pain, and sero-sanguinolent suppuration. The ulceration extended so fast, that in a few days the tibia was uncovered, the *periosteum* had a fungous appearance, and was raised by bony concretions. To save the patient's life, amputation was had recourse to the forty-third day from the appearance of the erysipelas.

The examination of the limb presented the following particularities. The soft parts were infiltrated with bloody serum. The anterior face of the *periosteum* was dense, and more injected than natural, and slightly adherent to the bone. On the femoral extremity of the *tibia* were numerous bony concretions, more adherent to the *periosteum* than the bone; for in raising this fibrous membrane the concretions were attached to it. These were less consistent than the normal bone; but without the spongy substance seen through a glass, the bony atoms appeared larger than those in the normal state. The inside of the *tibia* was furrowed with fissures about half an inch long, which penetrated into the medullary canal; and the bone was split into pieces, as if it had been caused by some mechanical means. The morsels of bone separated with facility were of a dark-yellow and dry, being evidently necrosed. The *tibia,* sawed longitudinally, showed at its extremities the medullary matter much injected. In the middle of this canal the matter was little altered; the marrow was fungous, and very red; where it corresponded to the fissures, it resembled the *chemosis* of the *conjunctiva;* where the continuity of the bone existed, the marrow was black, and exhaled a gangrenous smell; the cells and parietes of the reticular tissue were destroyed. The medullary canal was little dilated, but the compact substance was softened.

In this case the bony concretion corresponded to those parts of the medullary membrane that were gangrenous, though nature endeavoured to produce by the *periosteum* in concretions what the gangrene destroyed of the marrow and its membrane. Yet the latter predominated, and the *tibia* was extensively necrosed. Here we see two acts,—the destroyer and the repairer. In this case, the bone lost more than the *periosteum* could supply it with, and, consequently, it died.

2. *Acute Inflammation of the Medullary Membranes of the two Femurs.*—A young man, aged 18, of scrofulous habit, embarked for a voyage, which he felt the more, as it was winter and very wet, was attacked with pains in both legs. These pains were treated as rheumatic without success. The soft parts began to swell softly, and abscesses to form at the anterior and interior part of the thigh. In the course of the crural artery, a few of the

abscesses were opened. The remainder were allowed to break. The patient entered the Maritime Hospital of Toulon. All the appearances announced *necrosis* of both *femurs*. Expectant practice was adopted. There was hectic fever, but the patient did not suffer much except when a new abscess was forming. He died after remaining three months and a-half in the hospital.

The two *femurs* were swollen, but only their central thin compact substance was red, and easily divided by the scalpel, and was about half as thin as normal. The medullary canal was twice as large as natural, the reticular substance was increased, and its cells very large, the marrow nearly solid, was of a dark red. In the compact substance were discovered numerous canals, in which were blood vessels. (At this period M. D. knew nothing of the work of Howship.) The lungs, particularly the right, were full of tubercles.

3. *Necrosis of the two bones of the Fore-arm, caused by Chronic Inflammation of the Medullary Membrane,—Amputation and Cure.*—M. Seguin, aged 19, born of healthy parents, felt suddenly about four months ago, a violent pain at the left elbow: forty leeches were applied; and two hours afterwards, he was bled in the opposite arm. The left arm swollen to double its normal size. An obscure fluctuation was felt, and an incision made into it; arterial blood flowed from the wound. The incision was enlarged in depth, when a small quantity of pus escaped. Two issues were then put into the circumference of the humero-cubital articulation. Such is the patient's account of his treatment previous to his entering the hospital, which took place July 15, 1834, under the care of Professor Serres, who has given us this observation, which he intended publishing himself. The following is the state of the patient at the time of his entrance; the left fore-arm was three times larger than the right; and it was in a state of extension, as there was *ankylosis* of the humero-cubital articulation. Many *fistulae* allowed the escape of yellowish purulent matter, and several particles of necrosed bone. There was œdema and pain of the hand. The appearance of the skin and soft parts precluded the possibility of a cure, and the Professor announced it to be a disease of the medullary organ.

Before using extreme means, however, treatment by mercury was tried, viz. inunction with the mercurial ointment. After a few days the swelling was evidently diminished, mercury suspended was replaced by oily frictions; the arm regained its natural size, and the pain ceased. Mercury was resumed, and continued till the 5th of August, when suddenly the arm again swelled, became painful, red, and was accompanied by fever and diarrhœa. When the inflammation was diminished, the arm was amputated, viz. on the 25th of August. Immediate reunion was obtained by three stitches, and the day after the cicatrization was complete.

The examination of the amputated member showed complete *ankylosis* of the humero-cubital articulation. The two bones of the fore-arm were swollen and rough, presenting many openings penetrating into the medullary canal, by which it is easy to see small fragments of bones necrosed at the anterior face of the *radius*. The medullary canal was open for three inches and a quarter; its membrane was gray, fungous and slightly vascular at the extremities, rather red. The *ulna* offered the same alterations as the *radius*.

4. *Chronic Inflammation of the Medullary Membrane of the Tibia after a gun-shot wound. Inflammation increased by the injection of an irritating fluid into the canal.—Amputation of the Thigh—Cure.*—Antoine Rodrigue, a negro sailor, aged 31, of a sanguine temperament, received in a naval battle a ball in the left leg, which penetrated from behind to before, and came out under the internal tuberosity of the *tibia*. Three days after the accident, the vessel put into St Malo, and the patient was sent to the hospital. After four months he left, nothing remaining but a *fistula* communicating with the interior of the *tibia*. The movements of the limb, however, were

sufficiently free, as he went to sea again. But some months after the fatigue brought back the pains and swelling, and a large abscess formed itself in the course of the popliteal vessels. When opened sero-purulent fluid escaped. The patient entered the Marine Hospital, the fistula remained the same, and its cure was attempted by irritating injections, viz. hydro-sulphuret of lime weakened by the addition of water. This being rendered more stimulant, brought on severe symptoms, abscesses, gangrene, and hectic. Amputation being decided on, the operation was performed at the inferior quarter of the limb. A remarkable circumstance was, that the saw in one or two cuts passed through the bone. The soft parts about the femoro-tibial articulation were confounded into a slightly resistent (lardacé) tissue.

The entrance and exit of the ball, which happened eighteen months before, were full of vegetations and asperities of bone. The course of the ball was marked by a canal, in which there was no trace left of reticular tissue. The medullary piece of the superior extremity of the tibia resembled cellular tissue imbued with blood, the marrow was red, and emitted a disagreeable smell; the medullary canal was very much increased in size, and the compact substance, though it lost its thickness, did not the less preserve its consistence.

In the collection of M. D. is a metatarsal bone, as a type of the destruction which those bones can undergo. This bone is the fifth of the left side, and belonged to a young man aged 23, who had an ulcer at the exterior side of the dorsal face of the foot. In spite of every rational treatment, the disease remained stationary, the patient suffering little. The disarticulation of the fifth metatarsal bone was tried. Its junction with the cuboid limited the disease, and the operation succeeded. The bone was double that of its natural size; the compact substance had increased in consistence and thickness. The marrow was represented by a mass of vascular fungous substance, in which chemical analysis discovered a few of the principles contained in fat and fibrin. The periosteum was very vascular. Is it not to inflammation of the medullary tissue that ought to be ascribed some of those affections called white swellings, which do not immediately depend on an exterior cause?

The arthrodial articulations present many cases of pretended caries, in which the proper characters of this disease are sought in vain. Caries is oftener secondary here than primary.

We have profitted on all occasions of examining every case of white swelling of the articular extremities. These generally present a regular swelling and a rarefaction, which is the consequence of the chronic inflammation and hypertrophy of the marrow.

In the femur in cases improperly called *coxalgia*, it is to diminished cohesion of the molecules which constitute the head of that bone, that ought to be attributed what is called spontaneous luxation.

Dr Rush, in a work published at Vienna, upon Arthrocacology, endeavours to prove that the disease manifests a preference for the extremities of long bones, and that it commences by the inflammation of the internal *perisoteum*, (*Tela Medullaris* of Blumenbach.) To support his opinion, the author gives facts observed at the bed side, and drawn from pathological anatomy. A danger much more marked appears to us to distinguish the white swelling, which is seated in the marrow, from that which commences in the soft parts. M. D. gives the example of a case in which there was complete destruction of the head of the *femur* and a portion of the great *trochanter;* and the soft parts of the neighbourhood of the coxo-femoral articulation were incrusted with the osteo-cartilaginous concretions, without any determinate form. The *periosteum* and the marrow could not have concurred in the formation of these productions, where they were entirely destroyed. The neigbouring blood-vessels have then supplied their place; for the reproduction of this bony matter. M. D. saw in a man of 50 years of age, having a white swelling of the knee, the inferior extremity of the *femur* reduced to a bony shell, occupied by a vast cavity full of bloody pus.

Considerable and uniform swelling of the articular extremities of the long bones, attenuation, and often *ramollissement* of the compact substance, increased capacity of the cells of the spongy substance; the marrow degenerated into a substance more solid, imbued with blood, a little after either complete or partial destruction, are the ordinary anatomical characters of the arthrodial, commencing by attacking the medullary tissue.

Note.—It is requisite, in giving publicity to the views of M. Dubrueil, on the influence of the medullary membrane, to say, that they contain nothing absolutely new, and merely confirm what has been well known to those who have studied the pathology of the bones. The influence of the medullary membrane was shown by Dr Macdonald in his Thesis *De Callo et Necrosi*, and was explained by Dr Thomson in his Lectures on Inflammation, and by Dr Craigie, in his Elements of Pathological Anatomy, Chapter XVIII. Sect. ii. p. 564.

A new mode of curing Aneurism by Anastomosis, or the Blue Erectile Tumour, formed by the anastomosis of arteries and veins. Communicated by J. R. O'Bryen, M. D. Bristol. Perhaps there are few experienced practical men who have not often seen chancres attack the middle of the *corpus cavernosum*, and who must also have noticed more or less extensive loss of substance caused by them, as well as the *cicatrices*, (or dense fibrous tissues) which are formed, in consequence. The effect of these cicatrices in erection was, I believe, first observed by M. Lallemand, Professor at Montpelier,—at least so far as any practical result was concerned. He remarked that in a penis thus affected on one side, during erection, only the opposite side to the cicatrix was distended with blood, and as much of the other side only as lay between it and the *pubis*, while the part from the *cicatrix* to the gland remained perfectly flaccid. The reason of this is evident, the blood not having been permitted by the cicatrix to pass into the portion anterior to it.

The erectile tumour is in the greater number of cases a disease of childhood, being generally congenital. A Professor at Berlin proposed to cure it by incisions, which were to be immediately united by needles. But every practical man knows that the effusion of blood in such a case is often so great, that the child either dies in the operator's hands, or the general health is considerably injured, and often without the disease being cured. From the effect of the *cicatrix* above noticed, it was imagined that, by making a number of *cicatrices*, in different directions through the tumour, its circulation, and consequently its growth, would be arrested. M. Lallemand accordingly proposed and successfully put into execution, the following method of cure, viz. to introduce through the tumour a number of thin long needles, (not made of tempered steel, which is too brittle,) and then pass a ligature over the ends of them, so as to form a figure of 8—and by this means to cause inflammation of that part of the tumour between the ligature and needles—and consequently adhesion of the coats of the anastomosing vessels.

For the purpose of assisting and seeing this method put into practice for the second time, M. Lallemand requested me to accompany him in January 1835. The patient was the infant child of the Marquis de,——a Spanish nobleman, then resident at Montpelier, where he had taken refuge from the *cholera*, which raged in Spain. The child, aged 7 months, was healthy, and, though small for its age, was strong and plump. The mother was to outward appearance also healthy, and aged about twenty. The patient, when undressed and placed across my knees, for the purpose of proceeding to the operation, presented between the shoulders a blue erectile tumour, which M. L. said had increased during the last three months from the size of a dollar to its present dimensions, viz. from the spinous process of the fourth dorsal *vertebra*, extending to the eighth inclusive in length, and two inches some lines in breadth, of an oval figure, and raised above the surface of the surrounding skin a quarter of an inch. When the child cried and struggled, or when the tumour was much handled, it became turgid and firm.

The first day's operation consisted in introducing at one quarter of the tumour near its margin, seven needles parallel to each other, each needle passing through the tumour on a level with the surrounding skin; after which he applied a ligature on each needle, in the form of a figure of 8, taking care that the projecting end of each was guarded by a small piece of cork, or some other substance, to prevent injury to the adjacent skin. Three days afterwards he inserted in another quarter of the tumour other seven needles parallel to each other; and after a lapse of seven days from the first application, he introduced other seven needles in the same manner in the third quarter; and four days after, seven more needles in the fourth quarter, repeating the ligatures on each set of needles. When inflammation and slight suppuration had taken place round the needles, so as to cause them to become quite loose, he then withdrew them, which usually happened from the 7th to the 10th day after insertion.

The tumour now presented a rhomboidal or lozenge-shape; and he continued the same process through the remaining portion. The general health of the child did not appear much affected, except that, on the day following the insertion of each set of needles, there was a little febrile excitement.

A day or two after the removal of the needles from the first part of the tumour operated upon, instead of the blue erectile character, it became red, more resistent, and harder than the neighbouring skin, with which it was nearly on a level, though still a little inflamed and swelled. This treatment lasted until the end of March, when the whole presented nearly the above appearances.

On examining the child before I left Montpelier in May last, the circumference of the tumour was much less, it having evidently contracted at least one-third. It was then level with the skin, having a whitish-red, or pink tinge, not painful to the touch, or affected by the child's crying or by handling it, but felt harder than the skin, though not so elastic. Thus was accomplished a perfect cure; and I have no doubt, that the more dense parts of the new tissue formed, will be absorbed, and the skin which covered the tumour will approach, if not entirely acquire, its healthy state.

As I had an opportunity of judging in the case of the first child operated on by this means, a boy of 8 years of age, who presented a similar tumour on the right cheek, M. L. tried to cure it by incision. But the loss of blood was so considerable that he relinquished the idea of again trying that mode, having found it extremely difficult to arrest the hemorrhage. He then put the method above spoken of into execution. This took place many months prior to my seeing the boy, whose cheek then appeared as if it had been burned, but without any dragging of the skin, which was shining, smooth, and thickened, though not hard. A superficial observer, indeed, would scarce perceive it.

Bristol, Nov. 1835.

MISCELLANEOUS.

The profession will learn with regret the death of W. Twining, Esq. Assistant-Surgeon and First Assistant at the General Hospital of Calcutta. Mr Twining's high attainments as a medical man, and the unwearied attention he gave to the arduous duties of his profession, justly ranked him as one of its brightest ornaments. As a practitioner, he was eminently successful. To sound judgment, with thorough knowledge of the diseases incidental to tropical climates, and to which he had devoted the closest attention, Mr Twining added a soothing and affectionate manner that attached his patients, and won their confidence. His death has caused universal regret, the more so that the state of his health, previous to the unfortunate accident which produced it, gave promise of a long career of useful exertion.

Dr Twining had visited some of his patients in Chowringhee on the afternoon of Wednesday, 19th August 1835; and on his way to Mr Thomson's Dispensary, at that part of the road near to Government House, which leads from the course, a buggy ran against his carriage with such violence, as to overturn the buggy and the gentleman who was driving it. Mr Twining got out to ascertain if he was injured, and on examination he found there was a fracture of the thigh bone. With a humane anxiety that the gentleman should be removed as easily as possible, into a palkee, he lifted him from the ground without assistance, and in doing so Mr Twining had ruptured a blood-vessel or seriously injured himself internally, though at the time it occurred he did not seem to be aware of its extent. He drove immediately to Mr Thomson's and remained for a short period, not complaining of much pain, but breathing laboriously, and feeling an uneasy sensation in the chest. Dr M'Gowan, who was in the dispensary, accompanied him home to the hospital at his own request, and remained with him a great part of the evening. From that time to the following Tuesday, he was rapidly hastening to his end, and although he had every confidence himself that it would terminate favourably, and soon allow him to resume his duties, neither Dr M'Gowan or Mr Egerton had much hope that his confidence was well founded. He died at four o'clock on Tuesday afternoon, 25th August 1835.

We had received, a little before this announcement, the second edition of the work of Mr Twining. The principal addition is a preliminary Discourse on the Climate and Seasons of Bengal, embracing a view of the causes of disease in that country, and the most approved mode of preserving health. With this addition, we think the work of Mr Twining forms the most complete and useful compendium of pathological and therapeutic knowledge for Indian practice extant; and we recommend it as a work without which no practitioner should enter on his duties in India.

Notice to Students of Medicine.—The Harveian Society of Edinburgh have fixed on the following subject for their Prize Essay for the year 1837, viz.—"*An experimental inquiry into the relative Physiological and Medicinal Properties of Iodine, and its compounds.*"

Dissertations on this subject must be transmitted to either of the Secretaries, on or before the 1st day of January 1837. Each dissertation must be accompanied by a sealed Letter, containing the Name and Address of the Author, and inscribed on the back with a Motto. The same Motto must also be prefixed to the Dissertation to which the Letter belongs. None of the sealed Letters are ever opened except that bearing the same Motto with the successful Essay.

The Prize given by the Society to the successful Candidate, is either a Copy of the Quarto Edition of Dr Harvey's Works, published by the College of Physicians of London; or a Silver Medal with a suitable Inscription, at the option of the Candidate. The Prize is presented to the successful Candidate at the Annual Festival in April.

The Candidate is at liberty to employ his Dissertation afterwards, in any way he may think proper: And accordingly, some Dissertations presented to the Harveian Society, have, in consequence of publication, been productive of considerable honour and emolument to the Authors.—By order of the Society,

RICHARD HUIE, M. D., 8. George Square, } *Secretaries.*
RICHARD POOLE, M. D., 1. East Broughton Place, }
Edinburgh, 12th March 1836.

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